DOCUMENT RESUME

ED 264 144	SE 046 314
AUTHOR	Altmann, Antonin, Ed.; Lipertova, Paula, Ed.
TITLE	Didactics of Biology. Selected Bibliography for 1982. Parts I and II. Information Bulletin.
INSTITUTION	Charles Univ., Prague (Czechoslovakia). Central Library.
PUB DATE	84
NOTE	621p.; For related documents, see ED 238 688, ED 238 734 and ED 244 793.
PUB TYPE	Reference Materials - Bibliographies (131)
EDRS PRICE	MF03 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Biology; College Science; Geology; Higher Education; Instructional Materials; Science Activities; *Science Curriculum; *Science Education; Science History; *Science Instruction; *Science Materials; Science Teachers; Secondary Education; Secondary School Science; Teacher Education; *Teaching Methods; Technology

ABSTRACT

Selected articles on various aspects of biology teaching published in 1982 have been annotated in this two-part bibliography. Entries from 25 journals representing 12 countries are presented according to a topic area classification scheme listed in the table of contents. Countries represented include: Australia; Bulgaria; Czechoslovakia; Federal Republic of Germany; France; German Democratic Republic; Great Britain; Hungary; Italy; Poland; Soviet Union; and the United States. The 15 general topic areas include: didactics of biology as a scientific discipline; history of biology; biology instruction abroad; teaching/educational objectives; biology teaching at general education schools; gnoseological, psychological, and logical foundations of biology teaching; content of biology instruction; didactical principles in biology instruction; biology instructional media; science teachers; organizational forms of biology instruction; planning biology instruction; outcomes of biology instruction; biology tests; and articles concerning scientific biology. Each entry (numbered according to a code in the table of contents) includes author, original title (and English translation when appropriate), complete journal reference, and English abstract. Entries do not necessarily reflect all the topic and sub-topic areas included in the table of contents. (JN)

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INFORMATION BULLETIN

THE DIDACTICS OF BIOLOGY

Selected Bibliography for 1982

part I

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PRAGUE 1984

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Komenský, 106, 1981-1982, č. 1-10	Czechoslovakia
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Učební pomůcky ve škole a v osvětě, 21, 1982, č. 1-10	Czechoslovakia

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1.1. The subject-matter of the didactics of biology

1. KAHLE, J.B. - YAGER, R.E.:
Current Indicators for the Discipline of Science Education
Science Education, 65, 1981, No. 1, pp. 25-31. Lit. 19.

The authors summarize predominating opinions concerning the discipline of the didactics of science education, on the basis of the responses of representatives of 28 various schools and colleges in the US, with a total of about 200 respondents among college and university instructors. Their opinions can be summed up into 8 points: 1. The key to overcoming the current crisis in education are teachers. 2. Problems connected with scientific and technological progress and its social impact should form the central theme of instruction. 3. All subdisciplines should contribute to the formulation of the tasks and objectives of the didactics of the natural sciences and should also be responsible for improving the situation. 4. A new definition of the didactics of the natural sciences should reflect not only the specific aspects of these sciences, but also the nature of society and culture in which the sciences exist, as well as the expectations and hopes attached to teaching and education and finally also the needs of mankind. 5. The forming of criteria and mechanisms which will lead to an improvement in science teaching require largescale endeavours and the organization of an extensive pedagogical research project. 6. Science education represents more than only school instruction. 7. Education and instruction in the natural sciences should to a greater extent reflect the importance of various sciences and disciplines for specific groups of people (women, the handicapped, etc.). 8. Problems connected with values and ethics should be considered an integral part of a science education, since they are strongly linked to a whole complex of scientific, technical and social problems.

Didactics + biology - 147319

1.6 Scientific methods, main sources and organisation of scientific research

2. WELCH, W.W. - KLOPPER, L.E. - AIKENHEAD, G.S. - ROBINSON, J.T.:

The Role of Inquiry in Science Education: Analysis and Recommendations

Science Education, *65*, 1981, No. 1, pp. 33-50, lit. 14.

The authors report on the findings of a project carried out by a team of experts (which also included the publisher of the journal Science Education L. KLOPPER). The main premise of the project was that in spite of a large number of empirical studies, education theory and didactics have not been successful in making research a part of every teacher's teaching activities. Scientific research differs from a general inquiry in that it concerns the natural world which is governed by fixed laws, assumptions and axioms. In science a specific level of skills is required; the subject-matter of an inquiry concerns comparisons between existing and required quality of knowledge. Knowledge and skills can be classified into three groups: 1) skills concerning the scientific process (for instance observations, measurements, seeking out problems, verifying and carrying out revisions of theoretical models); 2) skill concerning generalised logical inquiry (selecting a specific strategy for solving a problem, the use of proof, logical deductions, the decision-making process, maintaining accepted rules and procedures); 3) skills connected with the nature of scientific research (epistemological problems of the psychological, social and natural environment, how it influences the process of scientific inquiry, the nature of preliminary assumptions and "great" theories, etc.).

didactics + biology, skills - 147319

1.9 Textbooks and printed lectures on the didactics of biology

3. HORNÍK, F.:

Nová polská učebnice didaktiky biologie (A new Polish textbook on the didactics of biology)

Přírodní vědy ve škole, 23, 1981-1982, No. 3, p. 90.

The didactics of biology have had a very good quality in Poland for some time. There is a great deal of cooperation with the G.D.R. in this area. The foremost authority on the didactics of biology at present is prof. Dr. W.Stawinski, Dr. Sc., from the Pedagogical Faculty in Krakow; he is also the main author of a textbook on the didactics of biology called Zary ogólnej didaktyki biologii (Warszawa, PWN, 1980). The textbook is divided into 35 chapters, of which the generalised part (written by Dr. Stawinski) has 21 chapters and the special part (written by a team of authors) has 14 chapters. In the special part the subject-matter is linked to general didactics and each chapter is finished by questions for repretition, a bibliography and a list of applications. The textbook also provides information on basic research in the relevant area. It stresses the need to accent the educational aspects of biology instruction. Some of the sections concerning methodologies in instruction are quite innovative, for instance when dealing with modelling and didactical games.

didactics + biology, textbooks, analysis - 147323.

4. SPANDL, O.P.:
Didattica della biologia (The didactics of biology)
Scuola e didattica, 26, 1980/1981, No. 4, p. 3

This new Italian textbook on didactics has been published by the La Scuola publishers in Brescia in 1980. It has 192 pages and deals in detail with teaching objectives in basic school, the selection of teaching subject-matter, methods of instruction, a time schedule for school work, etc. This is a practical handbook for teachers and is one of a series of didactical books published by this publisher.

didactics + biology, textbook - 147319.

3.1 Contemporary biology teaching and the didactics of biology in the foremost socialist countries

5. O izuchenii v obshcheobrazovatelnikh shkolakh. Knigi generalnogo sekretarya CK KPSS, predsedatelya Prezidiuma Verkhovnogo Soveta SSSR tovarishcha L.I. Brezhneva "Bospominaniya" (On teaching in general education schools, The books by the general secretary of the Central Committee of the Communist Party of the Soviet Union and the chairman of the Presidium of the Supreme Soviet of the USSR, comrade L.I. Brezhnev, "Memoirs")

Biologiya v shkole, 56, 1982, No. 2, pp. 3-4.

The Ministry of Education of the USSR has sent to all Republics a letter, signed by the Minister of Education of the USSR Prokofiev, concerning teaching in general education schools, which concerns the books of memoirs by the general secretary of the CC of the CP of the SU, comrade Brezhnev. The books have been published at the occasion of the 75th birthday of L.I. Brezhnev. The Ministry recommends the use of these books, which also include the book "Malaya zemlya", for carrying out education towards socialist patriotism in all teaching-subjects taught in general education schools. They can be made use of during special discussion periods, in extra-curricula forms of instruction, in the work of the Young Pioneer organization and the Komsomol, with the use of various methodological and organizational forms. Different topics to be discussed at meetings held concerning L.I. Brezhnev's books are also cited.

instruction + biology, communist education, USSR - 147307

6. POPOVA, L.A. - NESOV, L.A. - PUGOVKIN, A.P.:
Biologicheskaya spetsializatsiya v shkole - internate pri Leningradskom universitete (The biological specialization at a boarding school attached to the Leningrad university)
Biologiya v shkole, 56, 1982, No. 5, pp. 37-39.

The authors describe a selective boarding school attached to the Leningrad University. In the 9th and 10th classes pupils specialize either in mathematics and physics or biology and chemistry. The organization of work in classes is described for those majoring in biology, how instruction is organized, the curriculum and teaching syllabi, the organization of laboratory work and field work, how cooperation with the university is organized, etc. University students visit the school within the framework of their educational practical work. The authors also describe the selection process for accepting pupils to this school. In conclusion the profile of the graduate is desdribed and discussed.

instruction + biology, boarding school, practical educational activities of students - 147307.

7. STAWIŃSKI, W.:
Badania nad strukturą czynności nauczyciela i ucznia na lekcjach biologii i jej wpływ na nauczanie tego przedmiotu (A study of the structure of pupils' and teachers' activities during biology lessons and the influence of this activity on the learning of the subject).
Biologia w szkole, 35, 1982, No. 1, pp. 17-25. 1 tab., lit. 27.

The author here offers comments concerning the situation existing in biology teaching in Poland, especially its negative aspects and makes a comparison between endeavours to modernize instruction abroad and in Poland (among foreign countries the author mentions the USA, Brazil, Canada, FRG, etc.). He comes to the conclusion that the main assumptions for any modernization are the following: changes in methods of instruction and learning, more independent work by pupils, the more frequent inclusion of experiments and problem teaching, the use of original objects and other media, which lead to more active participation in class work by pupils and makes it possible for those who are behind to catch up. In Poland 40 % of biology teachers do not have a specialized biology classroom, classrooms are not furnished with modern furnishings, schools have difficulty in obtaining basic teaching media and pictures, transparencies, etc., are no longer produced in sufficient quantities, the majority of teachers are no longer permitted to carry out practical excercises with their pupils and instead of using modern teaching methods many teachers are returning to classical instruction methods based on an exposition and discussion. But it seems that in other countries there are also difficulties in implementing the requirements of modern instruction. Even in the USA many teachers are returning to classical methods of teaching, including an exposition, discussion, use of texts etc. Many teachers have ceased to use the green textbook (for biology majors) and instead use the yellow textbook which was written for non-biologists. In Brazil, where the textbook by Nuffield is widely used, changes in the content of biology teaching have not been accompanied by changes in methodology. The author comments this situation and stresses the need to study the activity of a teacher and pupil in the course of a lesson. Psychologists have studied individual operations and their relation to

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the target activity. However, also auxiliary operations as well as orientation, preparatory, control, corrective and formative operations exist. The author studied 1018 teaching lessons to determine the frequency of various operations done by pupils and teachers. He found that often the teacher carried out unplanned activities (up to 12.4 %) and made full use of only 50 % of the time available.

instruction + biology, modernization, methodology + instruction, media + instruction - 147303.

8. RISCH, S.J. - HANSEN, M.K.:
Science and Education in the People's Republic of China
The American Biology Teacher, 44, 1982, No. 3, pp. 157--163, 204; 5 figs.

The People's Republic of China in the eyes of the West represents a huge social experiment and hence also the teaching of science and education in general are considered to be interesting. Both authors are science teachers; they participated in a trip to China organized by "Science for the People". The article contains their general impressions and information on the teaching of biology and agricultural sciences. They devote special attention to the training of Chinese scientists and of young scientists who concentrate above all on practical problems of Chinese agriculture. They also comment the new policy of the Chinese government towards scientists. The article is very interesting, especially thanks to the interesting impressions described.

institutions of higher learning, education of scientists, China - 147307.

3.2 Contemporary biology teaching and the didactics of biology in the foremost capitalist countries

9. BARMAN - HARSHMAN - RUSCH:
Attitudes of Science and Social Studies Teachers Towards Interdisciplinary Instruction
The American Biology Teacher, 44, 1982, No. 7,
pp. 421-425. 4 tabs.

Scientific and special interest groups, as well as UNESCO have an interest in closer cooperation between natural and social sciences in higher level schools not only on a national but also on an international scale. The authors here concentrate on the problems of this cooperation. For this purpose they have sent out a questionnaire to which 300 natural science and 300 social science teachers who teach in the 6th to 12th classes of general education schools responded. Examples of the points in which both the natural and social sciences meet are arranged and summed up in a table.

natural sciences, social sciences, integration, USA - 147307.

10. BEISENHERZ, P.C.:
Putting Science and Society in YOUR Classroom
The American Biology Teacher, 44, 1982, No. 3,
pp. 180-181, 203.

The author poses the question of whether it is possible to really equalize biology as it is found in the curriculum and teaching syllabi with what is actually taught. If so, does it provide students with a qualified view of real life and also of social problems ? Only if students have the opportunity to study and become thoroughly acquainted with such biologically related problems as the environment, the number and quality of the population, genetics, mortality, racial problems, etc. can biology as a teaching-subject make an impact on the further life of the student. The author sums up 7 points concerning how teachers should proceed in biology classes so that school instruction becomes related to practical life. Only very good and enthusiastic teachers can provide their students with effective knowledge.

instruction + biology, didactical objective, combining theory + practice, USA. - 147307.

11. BLUM, A.:

Assessment of Subjective Usefulness of an Environmental Science Curriculum

Science Education, 66, 1982, No. 1, pp. 26-34, 1 fig., 3 tabs.

Usefulness is the main attribute of information obtained by a process of evaluation. The instruments for such evaluation are the subject-matter of this article. The author has written a special outline for the study of the environment in a rural area, as well as a questionnaire which he administered to 251 students and then to another 211 students. One of the important aspects of assessing reponses was to differentiate between boys and girls as far as the quality of understanding a text was concerned. A special study was undertaken to assess the new program, which differs in content as well as methodology from traditional programs.

instruction + biology, environmental conservation, teaching syllabi, studies - 147307.

12. DACIES, C.L.:
Scientific Inquiry for Infants
Natural Science in Schools, 20, 1982, No. 2, pp. 38-42. 3 figs.

The author stresses the need for acquainting young children with basic knowledge in biology, chemistry and physics. This knowledge must, however, be linked to every-day things which small children know about, such as for instance telephones, cooking, working in the garden, heating, light, cooling, etc. Knowledge should be presented in the form of interesting narration with correctly set educational and teaching objetives. In this way learning will form a firm foundation for the later study of real biology, chemistry and physics in higher classes of school.

elementary instruction - basic school.- - interdisciplinary relations, instruction + biology, instruction + chemistry, instruction + physics. - - 147307.

13. FRANYO, I. - JÁMBOR, G.:
Környezetismeret 5 (Learning about the environment 5)
A biologia tanítása, 21, 1982, No. 3, pp. 65-69.

Since the beginning of the school year 1982--1983 a new teaching subject is being introduced into the 5th class which continues in the subject-matter concerning the environment taught during the first four years of school. The new teaching-subject has been alloted 96 teaching lessons and concerns only the nature-study aspect of environmental theory. In the 5th class all the social aspects of this problem are concentrated in history. A textbook on the environment has been written and the pupils continue to use an atlas of flora and fauna, which they already used in the

4th class. This textbook was verified in the school year 1979-1980 and found to be suitable. In the final version of the textbook the subject-matter is divided into 8 chapters. Instead of mere descriptions of plants and animals the teaching syllabus assumes that pupils become acquainted with the complex relationships which exist among organisms in the environment.

basic school - instruction + biology, instruction + environment, textbook - 147307.

14. GEORGE, D.:
Children Live in an Age of Science
Natural Science in Schools, 20, 1982, No. 2, pp. 22-34.

The author stresses that already in elementary school the natural sciences are just as important as mathematics or English. He calls upon teachers to devote sufficient attention to science study and not to be afraid to include into class work various simple experiments which will captivate the attention of pupils, teach them to think logically and make them curious. On the basis of specific examples, the author shows how science can be made more attractive and how it is possible to extend pupils' knowledge of nature.

instruction + natural sciences, teaching methods, experiments - 147307.

15. GERARDINI, A.:
Spunti per las programmazione - classe terza. Science chimiche, fisiche e naturali (Topics for programming in the third class. The chemical, physical and natural sciences)
Scuola e didattica, 26, 1980-1981, No. 1, pp. 63-64. 1 fig.

Among the tasks of instruction in the final classes is the systematization of what has been learnt previously and acquainting pupils with scientific methods of research. The subject-matter of instruction deals mostly with great scientific theories (the development of the solar system, the development of the Earth, the development of life on Earth and the theories which explain these developments, etc.) and the systemization of knowledge in the natural sciences from the point of view of chemistry, physics and biology. In the course of instruction, stress should be placed on a systematic exposition; the use of scientific methods should be explained, as well as methods used to verify hypotheses and to sum up experimental findings. It is also important to acquaint pupils with methods of finding various information in the relevant literature and with the gathering of required documentation. A special diary can be kept in the class with documentation on specific subject-matter, as well as a bibliography. For each new topic studied, pupils should find the required literature, both in journals and books. The subject-matter in the final class of school can be divided into three parts: observations and studies of the school's vicinity (or region or country), the development of the Earth's crust and its changes (erosion and others) and finally the chemical and physical properties of matter.

systemization + knowledge, interdisciplinary relations - 147303.

16. HALADYNA - OLSEN - SHAUGNESSY:
Relation of Student, Teacher and Learning Environment Variables to Attitudes in Science
Science Education, *66*, 1982, No. 5, pp. 672-687, 6 tabs., 1 fig.

Some teachers consider learning attitudes to be an important outcome of instruction. The article acquaints readers with the findings of a project to determine student attitudes towards science. The study uses a theoretical model, which studies three basic factors which are thought to influence student attitudes towards science. The project concerned students from the fourth, seventh and ninth forms and their family environment and the influence of moving, of socio-economic status, hours spent watching TV, hours spent in schools, etc. were all studied. The project showed very interesting attitudes on the part of students, differences between boys and girls and a number of influences which deserve further, more detailed study.

natural sciences, instruction + natural sciences, attitudes + students, the environment + + students - 147303.

17. JANIN, L.C.:
Spunti per la programmazione - classe prima. Scienze chimiche, fisiche e naturali (Topics for programming in the first class. The chemical, physical and biological sciences)
Scuola e didattica, *26*, 1980-1981, No. 1, pp. 50. 1 fig.

The beginning of a three year course of study which continues in the instruction begun at the elementary level of school, is characterized by the heterogenity of pupils, and especially by their varied experiences concerning nature, depending on whether they come from rural or urban areas or from suburbs. The teaching syllabus should take into account the environment from which pupils come and the experiences they have gained. For this reason individual topics should follow each other in accord with the changing of the seasons in nature. Long lists of plants or animals should be avoided and preference should be given to complex approaches to the life of a small number of representative species in their natural environment. This can form the prerequisites for a modern ecological approach to nature, which is then extended in subsequent classes.

instruction + biology, basic school, the regional principle, ecology - 147307.

18. LATOROWITZ - REUVEN:

Teaching Biology Concepts to Disadvantaged Fourth-grade Pupils

Journal of Biological Education. 16, 1982, No. 1, pp. 59-64. 1 fig., 3 tabs.

The article describes a biology lesson for a 4th class of disadvantaged pupils in a special school. The lesson deals with the structure, shape and types of yeast cells; during the lesson pupils become acquainted with this living organism. Experimental and observation methods are used during the lesson, which has the form of a practical excercise undertaken with the pupils. The authors analyse the outcome of the lesson and describe the responses and behaviour of the pupils during the exercise.

instruction + biology, observations, experiments, practical excercise - 147307.

19. LOGAN, R.D. - O'HEARN, G.T.:
Thought Style and Life Style: Some Hypothesized Relationships
Science Education, 66, 1982, No. 4, pp. 516-530, 4 tabs.

Students in American high schools sometimes have difficulties in learning abstract terms. Increasing numbers of high school students have difficulties in learning operational thought styles which are defined by Piaget as the ability to see the real and the current in relation to the possible and as the ability to learn complex and systematic combinatorical analysis, the ability of propositional thought and the ability to think hypothetically and deductively. The purpose of the article is to report on a study of board cultural backgrounds and life styles in their relationship to though styles; changes in the former can lead to a decline in the quality of thought and this in turn influences basic scientific thought processes.

instruction + natural sciences, logical procedures, abstractions - 147303.

20. MATCHETT, E.:
New Beginnings
Natural Science in Schools, 20, 1982, No. 2, pp. 42-44.

A number of organizational changes have occured both in British industry and the educational system. The author worked for many years in industry in various managerial posts and in this article expresses his opinions concerning these changes. He stresses that positive, as well as negative consequences have taken place; changes have also occured as far as feelings of subordination and superiority are concerned. He sums up his experiences in five points, which express the reaction of an individual towards changes occuring in work and in the course of life cycles. In conclusion the author quotes Decartes.

education, industry, modernization, Britain, working-class, life styles. - 147307.

21. MIRAMONT, H.:
L´Enseigment de la Biologie dans les Colleges
(Biology education in colleges)
Biologie, Géologie, 69, 1982, No. 2, pp. 321-338.

The educational commission of the Association of Biology and Geology Teachers at its regional meeting summarizes in writing a study concerning biology and geology instruction in French schools and makes various recommendations for teaching topics, which include the following: how animals protect themselves against frost, the sensory functions of the garden slug and also that field work in a specific local forest be organized, work with living material and that audiovisual teaching media be used more extensively.

instruction + biology, instruction + geology, teaching topics, media + instruction, original objects, team teaching, field work, France - 147307.

22. PAGLIARI, M.:
Spunti per la programmazione - classe seconda. Scienze chimiche, fisiche e naturali (Topics for programming in the second class. The chemical, physical and natural sciences).
Scuola e didattica, 26, 1980-1981, No. 1, p. 56. Lit. 1.

The purpose of teaching the natural sciences is to provide pupils with the notion of their methodology and especially with the "auto-correction" which is constantly carried out by scientific research. Pupils should also learn to distinguish two different research strategies, one based on determining "conceptual structures", i.e. fixed and unchanging systems of relations and the second which is of a more "fluid" nature and requires "creative intuition"; it takes notice above all of numerous deviations and irregularities within the framework of "rules". The development of science is possible only by the constant encounter of alternative concepts; this leads to revolutions in science. Modernization requires a concentration on ecological aspects and above all on the ecology of relations among organisms in nature without the presence of man, whose seperateness from nature has proceeded to such lengths that man's impact on nature is now mostly negative. Later on in the course also "human ecology" should be taken into account, including the two spheres of human environment, the biosphere and technosphere. Instruction should strive to integrate the knowledge produced by various scientific disciplines concerning man and provide a survey of most of the "great problems" facing mankind (the demographic explosion, urbanisation, nutrition, energy sources, primary raw materials, disparity in development, destruction of the natural equilibrium).

23. PATRICK, J.J. - REMY, R.C.:
Crossing Two Cultures in the Education of Children
The American Biology Teacher, 44, 1982, No. 6, pp. 346-350.

American sociologists speak of two cultures in the sense used by C.P. Snow in 1963 - the culture of the ordinary life of people and the culture of science. At the time Snow's theme was rejected by many, but the authors of the article come to the conlusion that at present in the US this specific term describes the situation. They do not agree with this state of affairs; in their opinion especially science instruction within the school system should make a major contribution to overcome this situation. School courses in the natural sciences should form the basis for human behaviour towards the environment and nature in the third millenium.

instruction + natural sciences, natural sciences, culture + society, USA - 147301.

24. SIMPSON, R.D. - TROOST, K.M.:

Influences on Committment to and Learning of Science among Adolescent Students

Science Education, 66, 1982. No. 5, pp. 764-781. 4 figs, 2 tabs.

The interest which people in the US have in science seems to be decreasing and is often lost in the superficialities of consumerism. Foremost American scientists are afraid that in the future this situation will lead to a decline in the number of scientists available and hence to a general decline in the quality of science in the US. The authors of the article express the opinion that the amount and quality of scientific knowledge which students gain in the course of high school is insufficient and that the general environment the students find themselves in outside school is not conductive to forming an interest in science. On the basis of a preliminary study the authors have attempted to determine and assess what and to what extent influences students' relations towards scientific knowledge, the influence of the students' personality on this factor and the influence of the family environment, as well as that in the school and class.

scientific education, instruction + the natural sciences, interest in + science, USA - 147303.

25. TOCCI, S.:
Project Advaced Biology: An Alternative to Advanced Placement Biology
The American Biology Teacher, 44, 1982, No.
pp. 286-290. 4 figs.

The new concept of instruction in the natural sciences (i.e. biology, mathematics, chemistry and physics), which has gradually been introduced since 1973 in the schools of four states in the US, is extensively described in this article. Attention is devoted to the use of modern instruments found in biological laboratories. The author also describes practical supervision by the teacher when students work on their assignments and the advantages which the new system provides. Students participate in research on the basis of the assignments they receive or which they chose by themselves with a teacher's approval.

Instruction + biology, modernization, secondary school, biology + school techniques, instruments, biology + laboratory, USA - 147307.

26. YAGER, R.E.:
The Crisis in Biology Education
The American Biology Teacher, 44, 1982, No. 6, pp. 328-336.
1 tab.

Just as in France, also in the US biology teachers and environmentalists struggle to attain greater comprehension on the part of the government. The author expresses the opinion that contemporary biology teaching in the USA is in a state of crisis, which should be overcome as soon as possible. The author describes the past, present and future of biology instruction and discusses at length the situation after 1950. 1976 represents an important year when a certain amount of attention was devoted to biology as a consequence of the success of Soviet astronautics in 1957. The author then makes various forecasts until the year 2000 when the problem of biology will again become pressing in the US.

instruction + biology, modernization criticism, USA - 147303.

4. Education and teaching objectives and the tasks of biology instruction

27. DELBRÜCK, M.:
Der Pfeil der Zeit - Anfang und Ende (The arrow of time - beginning and end)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 4, pp. 97-102. 3 figs.

This is a speech made by the author, who is a Nobel Prize winner and the founder of molecular biology, at the annual gathering of the California Technological Institute at Pasadena, Cal. in 1978. In March 1981 the author died in Pasadena. In this speech he analysed the importance of science in contemporary endeavours for truth in society. He tries to answer the question of whether the past (history) can tell us something about the future. In the contemporary world, three quarters of mankind are suffering from hunger and there is constant danger of nuclear warfare. While the natural sciences now have an extremely important role to play, natural scientists are unable to overcome the constantly present threat of death, aggression and violence. The author touches upon the question of the development of the Earth, legends and scientific fact. Previously, history rested upon legends, prejudices, as well as miracles, the intervention of God, while now history strives for objectivity. He concludes with the thesis, that what is good for science is also good for mankind.

the natural sciences, biology, historical method, truth - 147307.

28. GERARDINI, A.C.:
Biologia (Biology)
Scuola e didattica, 26, 1980-1981, No. 9, pp. 56-58.
2 figs.

The author discusses various aspects of making a final summary of the structure and content of the biology course . The article provides a classification of biology on the basis of fundamental scientific theories, such as the theory of the development of man, cellular theory, hereditary theory, the development of the embryo and the theory of the development of life on Earth. It also describes in detail the didactical principle used in an exposition to explain the development of life and various forms of organisms. This topic assumes the use of a microscope.

biology, instruction + biology, scientific theory, structure - 147307.

29. HANKE, M.:

Zu einigen weltanschaulich-philosophischen Bildungs- und Erziehungszielen im Biologieunterricht Klasse 8 (Concerning some worldview and philosophical educational and teaching objectives in biology teaching in the 8th class)

Biologie in der Schule, 31, 1982, No. 6, pp. 242-244. 1 fig.

An important component of forming a scientific worldview in pupils are the subjects of elementary science and civics. The author describes the teaching of the topic concerning the reaction of the eye pupil to the intensity of light and the significance of work and speech for the development of human intelligence and awareness. Such and other similar topics are very important from the point of view of forming pupils' worldview.

instruction + biology, scientific worldview - - 147313

30. HEFTER, I.:

Zur Gesellschaftsrelevanz der Schulbiologie. Gedanken zu einem Transfer in die Unterrichtspraxis (Concerning the social relevance of school biology. Comments on its transfer into practical instruction)

Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 7, pp. 258-261. Lit. 34.

The author stresses the requirement of the social relevancy of school biology instruction and compares didactical requirements and their actual implementation in the teaching syllabus. Various topics are assessed from the point of view of their importance for society. Teaching syllabi should be re-assessed

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from this point of view, because the educational objectives of biology are often set without taking social aspects into account. This is essentially pressing at a time when mankind is threatened with self-destruction, with environmental deterioration, etc. The author attempts to define criteria for the selection of various topics into the teaching syllabi of various classes.

instruction + biology, teaching syllabus, relevancy + society - 147307.

31. HORNÍK, P.:
Taxonomie struktur všeobecného biologického vzdělání
(A taxonomy of the structure of general education in biology)
Přírodní vědy ve škole, 33, 1981-1982, No. 2, pp. 42-45.
Lit. 12.

The most important didactical category is the teaching and educational objective, which expresses the requirements of a socialist society in the training of the young generation. Objectives are defined as the intended and expected outcome of teaching and education towards which the teacher, together with his pupils, strives; changes in knowledge, skills and attitudes of pupils occur, as well as in their general personal attitudes. The author distinguishes objectives in the areas of cognition (knowledge, skills, abilities and habits), in the area of convictions (interests, attitudes, persuasions) and in the area of action (behaviour, volition). The structure of biology instruction objectives is decisive for the selection of teaching subject-matter, make it possible to plan instruction, and to control the whole process of instruction. Among cognitive objectives, the following should be included: knowledge of basic facts, knowledge of terminology, the ability to make axiomatic statements, to formulate laws, hypotheses and theories, knowledge of methods and work procedures used in biology, biological knowledge important from the point of view of present and future practice, sources of biological knowledge, knowledge of symbols, formulas and abbreviations, knowledge of selected definitions and notions, of criteria and their importance, sensomotoric skills, intellect and logical skills. Among the value objectives (axiological objectives) are interests, atititudes and convictions (communist education), while objectives in the area of action include an active social and personal orientation, use of the knowledge learnt, attitudes which are in harmony with those of society as a whole and social committment which is creative and purposeful.

education + objectives, teaching + objectives, instruction + biology, taxonomy + objectives - 147307.

32. PAGRL, L. - KURZE, M.:
Vorschläge zur Aktualisierung des Biologieunterrichts nach dem X. Parteitag der SED (Suggestions for making biology instruction more timely after the Xth Congress of the Socialist Unity Party of Germany)
Biologie in der Schule, 31, 1982, No. 1, pp. 1-5. 1 tab.

The article contains directives for the utilization of the documents from the Xth Congress of the Socialist Unity Party of Germany, which gives teachers the task of acquainting pupils with objectives and opportunities for the efficient utilization of natural resources and the use of bio-technologies. The purpose of the article is to show, on the basis of practical examples, how this task can be fulfilled. First the author discusses the possibility of using algae as a source of human food and the need to decreases losses in fruit crops which occur when fruit is stored. A lesson on these topics is described in detail, including the development of problem situations.

instruction + biology, biology + technology - - 147307.

6.1 The forming of biological notions and terminology

33. LEVINA, M.M. - BLINOVSKAYA, Y.V.:
Didakticheskiye usloviya sposobstvuyushchiye osvoyeniyu uchashchimsya biologicheskikh ponyatiy (Didactical conditions which lead to pupils' learning new biological notions)
Biologiya v shkole, 56, 1982, No. 5, pp. 27-32. 4 figs.

Biological notions are the basic elements of the teaching syllabus. In the course of instruction, notions are formed gradually and on the basis of increased amounts of information received by the pupil, while at the same time various teaching media are used. In practical teaching, teachers often find that pupils correctly use a term which designates a notion, but that they do not understand the content of the notion and are unable to distinguish what is essential in the notion and describe it. For this reason a change in the formulation of the question or the forming of a non-standard situation may lead to serious problems, because pupils suddenly do not understand the essence of the phenomenon or process which the notion or term reflects. To overcome such problems the authors provide detailed instructions, especially connected with the notion of a "reflex" and sum up four conditions which lead to an understanding of a scientific notion.

instruction + biology, notion + forming -
- 1473

34. PAKULOVA, V.M.:
Rabota s terminami na urokakh biologii (Working with terms in biology lessons)
Biologiya v shkolakh, 56, 1982, No. 8, pp. 33-35. 1 tab.

The author deals with the use of terms in biology instruction and how they should be taught. She stresses the need to find relationships between various terms. She defines a term as a word which designates a specific notion. It has a nominative function (it reflects the name of the notion) and a functional function (it reflects the content of the notion). In the course of teaching, the semantic aspect of the term should be clarified. A notion forms the nucleus of a term. To understand the meaning of a term assumes that pupils become acquainted with its content and essential characteristics. A term is in a specific relationship with a notion, the definition of a term is not, however, identical with the definition of its notion. But in a certain sense, a term is found within a notion. In the 5th and 6th classes use is made of terms of Russian origin and foreign terms are always translated into Russian. Foreign terms should be written on the blackboard, pupils should be taught how to pronounce them and should write them down in their notebooks. For such terms, both their etymology and semantics should be clarified. Terminological dictations are also a good form of veryfying whether pupils have learnt terms. In the lower classes the author thinks it suitable to

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cite a term before its notion is clarified. Systems of terms should always be used, not only individual terms and notions. The theory formulated by the author is then demonstrated on the basis of a teaching lesson concerning Ciliatea and the Giant paramecium.

instruction + biology, notion + forming, terminology, - 147313.

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6.5 The forming of habits and skills

35. SUKHORUKOVA, L.N.:
Formirovanie u starsheklasnikov umeniya delat mirovozrencheskiye obobshcheniya (Teaching older pupils the skills used in worldview generalizations)
Biologiya v shkole, 56, 1982, No. 3, pp. 27-32.

The author discusses the worldview education of pupils within the framework of biology instruction. She places stress upon the subject-matter of general biology, where the forming of a scientific worldview is an important component. She stresses the need to teach pupils to think for themselves and to be able to draw worldview conclusions from biological subject-matter. The quality of this skill is demonstrated in the article by questions and answers given by pupils. The findings of this study are quite negative. For this reason the author demonstrates to readers how to proceed in such situations, on the basis of specific examples of a teaching lesson.

instruction + general biology, forming + + scientific worldview. - 147313.

6.7 Guiding pupils towards successful learning in biology. The motivation for learning. The activation of pupils. Pupils' interests. Pupils' selfcontrol

36. GURLEV, I.:

Privivat detyam lyubov k prirodě (To instill a love of nature in children)

Biologiya v shkole, 56, 1982, No. 4, pp. 56-59.

It is the task of every teacher to teach his pupils the foundations of the sciences, to help form their scientific worldview and communist convictions, a positive attitude towards work, to teach them practical skills and habits and the ability to study independently and also to educate them towards a positive attitude towards nature. The relation of pupils towards nature is formed from the 1st class onward. Pupils learn to cultivate and take care of potted plants, they care for greenery in classrooms and the vicinity of the school and from the 5th class onward they participate in extracurricula work connected with plant cultivation and work on the school plot of land. They also work in the forest, make bird boxes, conduct meetings on nature conservation and participate in practical nature conservation activities. The author of the article has been supervising various nature hobby clubs for 20 years. At present he cares for 6.5 hectars of young forest growth together with his pupils. Pupils also save young fish during spring floods and return them to the river and follow the spring movements of birds. The children are very much attracted to nature conservation activities.

instruction + biology, hobby club activities, nature conservation - 147313.

37. IWON, W.:
Interessen im Biologieunterricht. Eine Befragung der Klassenstufe 5/6 und 9/10. (An interest in biology instruction. Questions for classes 5, 6, 9 and 10) Naturwissenschaften im Unterricht-Biologie, 30, 1982, No. 4, pp. 141-142. 1 questionnaire.

326 pupils from the 5th, 6th, 9th and 10th classes from a general education secondary school in Hamburg were asked to give their opinions concerning various aspects of biology instruction. The questions included whether they considered the number of lessons devoted to biology as excessive or not, which topics in the biology syllabus are of greatest interest to them, which aspects of the topic Dogs did they consider to be most interesting and which biology methods do they consider to be most interesting. The majority of the respondents consider 3 lessons a week as adequate. In the lower and higher classes pupils expressed greatest interest in those topics which touch upon the individual and society. The use of films was considered to be the most interesting method of work, as well as observations and small-scale biological experiments.

instruction + biology, instruction + methods, plan of learning, interests + pupils - 137303.

38. YUSHKENE, J.S.:
Kak my uchim shkolnikov zabotitsya o prirode (How we teach pupils to take an interest in nature) Biologiya v shkole, 56, 1982, No. 4, pp. 66-69.

The author informs readers about the organization of practical work in nature conservation studies, in a secondary general education school, specifically the conservation of the atmosphere and the soil. In

1978 the pupils of School No. 22 in Klaypene first set for themselves the task of properly stocking the biology stock room in the school, the gathering of extensive literature and the bringing together of natural artefacts; in this project pupils were helped by teachers and many parents. In the 10th and 11th classes nature conservation is a subject of instruction and also includes nature conservation in an urban environment and in the close vicinity of the school, the organization of discussion groups, etc. Various model situations concerning nature conservation are described. Also pupils in the 4th and 8th classes participate in these activities. A total of 306 pupils participated in these activities; the author provides detailed information concerning various classes.

instruction + biology, nature conservation, biology stockroom, teaching media + biology, biological activities - 147303.

39. KLAWITTER, E. - NAUNAPPER, L. - WENZEL, H.:
Hohe Lernaktivität durch gute Lernmotivation (Extensive teaching activity on the basis of good motivation for learning)
Biologie in der Schule, 31, 1982, No. 6, pp. 226-229. 1 fig.

When the motivation to learn exists, this leads to adequate mental processes taking place. They should however, be connected with existing teaching objectives. On the basis of their own observations, the authors stress that providing the motivation to learn is not always easy, especially for a teacher. The problem is aggrevated by the fact that usually more than a single motivational factor is at work, but rather a whole structure of motives. For every assignment a specific relation between the motive to work and the motive to undertake some other activity exists. These theoretical discussions are illustrated by the authors on the basis of the topic "The anatomy and physiology of plants", which is taught in the 9th class.

instruction + biology, instruction + motivation - 147303.

40. KREMER B.K. - WALBERG, H.J.:
A Synthesis of Social and Psychological Influences on Science Learning
Science Education, 65, 1981, No. 1, pp. 11-13. 5 tabs., lit. 43.

This study is part of a project which aims at a synthetic sociological, psychological and educational study of the learning process in the 6th to 12th classes. Psychological data include the intelligence of the students, their abilities and their motivation to learn. Sociological data concerns family environments and status within the class and peer group. A synthesis is carried out on the basis of the relevant literature; it includes a total of 20 items and an analysis of their various correlation calculations. The main findings are summarized in tables. In conclusion the authors state that problems of motivation, as well as the influence of family background and peer status as variables in relation to the learning process have not been studied sufficiently. A bibliography is attached to the study.

learning, cognitive process, basic school, instruction + motivation - 147303.

41. LIPPOLD, P.:
Erkenntnisinteresse entwickeln - aber wie ?
(The development of cognitive interests - but how ?)
Biologie in der Schule, 31, 1982, No. 6, pp. 230-232.

One of the opportunities for the forming of positive motivation for learning is the stimulation of cognitive interests. While in the lower classes such interests require supervision, in the upper classes it is sufficient to arouse them. An interest in the subject-matter being taught and in creativity will develop only if pupils are activated mentally and emotionally; the introductory lesson is especially suitable for this. The author then goes on to discuss how this introduction to the coarse should be prepared on the basis of the example of the topic "The anatomy and physiology of plants". He stresses the need to combine ecological problems with their social aspects. In conclusion he describes his own positive experiences with the supervision of a hobby club devoted to genetics.

instruction + motivation, hobby club, genetics - 147303.

42. LÖWE, B.:
Schülerinteressen und Biologieunterricht. Forschungsansätze und schulpraktische Konsequenzen (Pupils' interests and biology instruction. An introduction to research and practical consequences for school)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 2, pp. 33-38. Lit. 37.

The author attempts to analyse and explain the term "interest" and to study it in relation to human ethology. Interests are very important in the strategy of problem teaching. The forming of interests is included in all teaching objectives. A study of interests and their development is thus a component of studies concerning the didactics of biology, as well as human ethology. Interests are among the most important learning motivations and hence a prerequisite both for teaching and learning. The author distinguishes three degrees of interests: 1) the acceptance of information and becoming attentive (receiving, attending), 2) reacting (responding) and 3) assessing (valuing). In assessing the function of an interest it is necessary to take into consideration the relation between a person and his environment. The author also provides information on various research concerning interests in school. The arousal and strengthening of interests is one of the foremost tasks of school.

interest, motivation, problem teaching, marking + in interests, research - 147303.

43. MYAGKOVA, A.N. - KUMYANTSEVA, M.N.:
Rozvitie u shkolnikov interesa k biologii (Developing in pupils an interest in biology)
Biologiya v shkole, 56, 1982, No. 3, pp. 38-41.

The authors report on experiences gained by teaching at Moscow school No. 199. At this school the whole teaching staff concentrated on increasing pupils' interests in biology instruction and this led to the achievement of very good results. A system of class and extracurricula work was developed by the school which includes laboratory work, care of living plants and animals, work on a school plot of land and work in the school library. Pupils receive assignments which are adequate to their age. In conclusion the authors sum up the outcome of the educational impact on pupils made by the school.

instruction + biology, motivation, teaching media + biology, extracurricula activities - 147303.

44. PATOČKA, K.:

Jak vést děti k zájmu o přírodu (How to guide children towards an interest in nature)

Komenský, 106, 1981-1982, No. 6, pp. 346-349.

Pupils gradually learn basic knowledge concerning nature from the 1st class onward - in the 1st class and 2nd class in the subject of elementary learning and in the 3rd and 4th classes in science instruction. In both cases the sensibility and emotional relationship of children towards the beauties of nature are stressed, as well as towards the vicinity of the school. In the course of teaching, childrens´ interests in science instruction must be developed; the choice of a suitable method of teaching and adequate organisational forms are especially important. Practical activities should be used to a sufficient extent, as well as independent work by pupils. The author assesses the importance of elementary laboratory work, the use of original natural objects in class, work on a school plot of land, excursions which are used for observations and for experiments done outdoors. The author also recommends various topics and assignments for use in hobby club activities and provides a bibliography to augment the motivation of pupils.

elementary learning, science, 1st level of basic school, forming + interest, motivation, activity + pupil -
- 147303.

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45. ROHDE, C.:
Zur Motivation in den Klassen 9 und 10 (On motivation in the 9th and 10th classes)
Biologie in der Schule, 31, 1982, No. 6, p. 233.

The biology teaching syllabus for the 9th and 10th classes is of an abstract nature, which together with a low degree of ostensiveness is the cause of difficulties in learning. To increase pupils' interests, the author recommends the use of models, TV programs, etc. and also increasing motivation. The author then describes how in her own work she has implemented these recommendations.

instruction + biology, general education school, 9th and 10th classes, motivation - 147303.

46. ROLBITZKI, D.:
Diagnostik der Lern- und Leistungsmotivation im Biologieunterricht (The diagnosis of learning and performance motivation in biology instruction)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 2, pp. 53-64. 13 figs., 4 tabs., 3 tests, lit. 13.

Motivation problems are among the most important problems facing all types and levels of schools. A teacher can hardly cope with the problem in view of the many obligations he has. For this reason the author analyses the problem of how to diagnose learning motivation and performance in school-work. Motivation as such is the prerequisite for successful work, both by teachers and pupils. Diagnosis methods concern an analysis of the content of the subject-matter taught, its critical assessment, the outcome of teaching and assessing the results achieved. To analyse the content of the subject-matter taught, the author uses various tests. He describes the use of objective methods (arousing an interest on the basis of demonstrating that pupils lack knowledge). For determining the interest that pupils have in biology the author used a specific interest test (FIT = Fachinteressentest) with 46 questions; for determining interests in learning a learning test (LRT = Lerneninteressentest) with 55 questions which concentrates on the work of the teacher and a test to determine the performance of the pupil (Leistungsresultatstest). The author presents his findings based on the evaluation of these tests and demonstrates the contribution to a teacher's work which their analysis can bring.

Instruction + biology, motivation + instruction, forming + interest, pupil activity, interests test - - 147303.

47. SCHWARTZ, A.:

Eine eigenwillige Art der Motivation ? (An unusual method of motivation ?)

Biologie in der Schule, 31, 1982, No. 6, p. 234. 1 fig.

The author stresses the great importance of motivation in teaching. She recommends the use of texts with words left out which the pupils are asked to fill in and crossword puzzles which make it possible to strengthen what has been learnt. She analyses in detail the use of these methods.

motivation + instruction, didactical games - 147303.

48. STREY, G.:

Der Erfahrungsbereich der Schüler und wie man (vielleicht) doch etwas darüber erfährt (The experiences gained by pupils and how (perhaps) we can learn at least something about them)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 6, pp. 229-230.

The author offers his comments on the relation pupils have to the subject-matter they are taught. While the majority of the topics taught provide new knowledge and skills, the pupils feel they do not participate in any way in chosing and planning what they are taught. This situation can be greatly improved if, in planning instruction, the teacher makes full use of the natural objects available, as well as nature excursions. Much of course also depends on the teaching methods and organizational forms of instruction. When a teacher knows his pupils very well then he knows when and where they can be included into the planning of class work. Then chosing topics, we should also take into consideration whether pupils have sufficient preliminary knowledge to understand the topic, whether their own experiences will contribute to understanding the problem to be learnt and whether it will be possible to achieve a positive attitude towards the subject-matter in question. When we are able to make pupils curious, and arouse in them an inclination to satisfy their curiosity, then they will be active and will learn successfully.

instruction + biology, lesson plan, activity + pupil, original object, teaching methods + biology, organizational form, modernization - 147303.

49. TILLE, R.:
Aufgaben für alle Schüler, die Phantasie anregen
(Assignments for pupils which stimulate the imagination)
Biologie in der Schule, 31, 1982, No. 4, pp. 149-150.
3 figs.

There are various possibilities concerning introductory lessons when new groups of animals are discussed in the 5th and 6th classes of general education schools. In the author's opinion this lesson should serve to provide pupils with a sound knowledge of the basic characteristics of each zoological group and at the same time to form the prerequisites for understanding phylogenic relations. The name of the group is at first unimportant since the relevant term can be fully explained only at the end of the lesson. The author demonstrates this procedure on the basis of the example of Coelenterate, flatworms and Tracheata. The pupils themselves plan the lessons.

instruction + zoology, 5th and 6th classes, general education schools, notion + forming, systematics -
- 147303.

6.72 The education of logical thinking in biology instruction, logical procedures

50. BRETSCHNEIDER, J.:
Überlegungen zur Entwicklung des Systemdenkens der Schüler im Biologieunterricht der Klassen 9 und 11.
(Considerations on the development of system thinking in biology instruction in the 9th and 11th classes)
Biologie in der Schule, 31, 1982, No. 12, pp. 534-538.
2 figs., 1 tab.

System thinking in biology, means thinking in a wider context, understanding causality and the mutual dialectical impact made by various components of living nature and giving priority to the analytical and synthetic methods. A clarification of the system characteristics of living nature requires distinguishing various structural levels which are studied in biota systems. For the designation of various structural levels, such terms as organism, population, biocoenosis, etc. are used. Bio-systems form specific hierarchies with mutually interconnected spatial and temporal material systems and with specific organizational and developmental characteristics, which at the same time behave according to general functional principles and influence each other on the basis of metabolic, energy and information processes. The author then characterises the relation between bio-systems and their environment and methods by which the system of living nature can be adequately reflected.

instruction + biology, system approach, logical procedures, biocoenosis - 147303.

51. CLARKSON, J.:
The Structure of Scientific Knowledge
Natural Science in Schools, 20, 1982, No. 3, pp. 79-85.

Structuralism attempts to present the basic subject-matter of school instruction in the form of a specific system. The author here discusses the structure of scientific disciplines, where new knowledge leads to changes in their mutual interaction - for instance the subject-matter of physiology is now strongly rooted in biochemistry. A similar situation exists in the other sciences as well; their further development depends upon the further development of another science. The author describes in detail other principles of structuralism and cites various examples, such as for instance a study of the environment within the framework of biology is connected with chemistry and the social sciences. A teacher must keep this in mind, if he wishes his exposition to be of a complex nature.

instruction + biology, basic subject-matter, structure of subject-matter, interdisciplinary relations - - 147313.

52. DILLASHAW, G.F. - YEANY, R.H.:
The Use of Strategy Analysis to Train Teachers in the Application of Selected Teaching Strategies
Science Education, 66, 1982, No. 1, pp. 67-75. 5 figs.

Theoretical work concerning the strategy of a science teacher's behaviour and activity in the course of teaching his discipline. It includes three important criteria which a teacher should keep constantly in mind: maintaining spontaneous and continuous contact with students, casual behaviour and expositions based on a profound knowledge of the subject-

-matter and careful preparations for the lesson. The author develops these criteria into detailed outlines which thus form the strategy of a teacher in the course of his work. This work is based on older work dealing with teaching strategies and is modernized on the basis of the latest findings of pedagogics and the didactics of the natural sciences.

strategy + instruction, preparations for classwork, contacts + pupils - 147313.

53. CHIAPPETTA, E.L.:
The Relationship Among Logical Thinking, Problem Solving Instruction and Knowledge and Application of Earth Science Subject Matter
Science Education, 66, 1982, No. 1, pp. 86-93. 4 tabs.

One of the main objectives of instruction has always been the education of students capable of analytical thinking. Reflexive thinking leading to the solution of problems has always been one of the most important objectives of instruction. However, in the author's opinion, the notion of problem-solving as the first outcome of instruction in the sciences is questionable. No acceptable definition of problem solving exists. Many terms are used, such as "analytical thought", "critical thinking", "reflexive thinking", "scientific method", etc. The purpose of the author's study is to analyse the relationship between the independent variables of various levels of logical thinking and instruction methods and the dependent variables of ecological performance at the cognitive and application level. This is a theoretical paper with practical examples concerning practical ecology.

instruction + ecology, thinking, logical procedures, science + method - 147313.

54. KLAHM, G.:

Der Vergleich im Biologieunterricht - exemplarisch dargestellt am Beispiel Feldhase-Wildkaninchen

(A comparison in biology instruction - on the basis of the example of the Common hare and European rabbit)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 9, pp. 315-320. 5 photos, 2 worksheets, lit. 10.

Making comparisons is very important for learning biological notions, making generalizations and distinguishing two related biological phenomena. The author cites as an example for making a comparison two animals, which are both representatives of the order Lagomorpha, the family Leporidae - the Common hare and the European rabbit. Because they look similarly, they are often mistaken by the lay public, or they are considered to be a single specie. A comparison shows identical but also differentiating characteristics and teaches pupils to make precise observations which are needed for this purpose. The aim is to distinguish the two animals on the basis of their body structure and function of organs, on the basis of their social behaviour and behaviour when facing an enemy, to distinguish their differentiating characteristics when they are newly born and young and how they adapt to the environment, etc. The author recommends the use of a live rabbit, a film on the European rabbit, slides and clippings from magazines. He describes in detail a teaching lesson devoted to this purpose and adds two worksheets for the use of teachers.

instruction + zoology, logical procedures, comparions, worksheets - 147313.

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55. RÖDIGER, W.:
Einige Vorschläge zur Ermittlung und Bewertung kausalen Denkens im Biologieunterricht (Several suggestions for determining and assessing causal thinking in biology instruction)
Biologie in der Schule, 31, 1982, No. 7/8, pp. 297-300.

Studies of the existence and state of causal thinking have shown that it is better to assess facts and relations separately. The essence of learning causal relations is an understanding of context and hence relations should be valued higher than facts in terms of school marks (for instance one point for a fact and two points for a relation). These theoretical considerations are made more specific on the example of fish breeding. In conclusion the author discusses problems connected with a study of judgements and assessments.

instruction + biology, thinking, causality, research, evaluation - 147313.

56. TILLE, R.:
Kausalen Urteilen im Biologieunterricht (Causal judgements in biology instruction)
Biologie in der Schule, 31, 1982, No. 7/8, pp. 300-304.

Among the most frequently made errors in making judgements is an interchanging of cause and effect, not knowing the cause of something, or considering a condition to be the cause of something; sometimes factually correct causal relations are mistakenly interpreted by speech. The author documents this on the basis of a number of examples taken from his own work.

instruction + biology, thinking, causality, evaluation - - 147313.

57. WIEGELMANN, R.:
Zielgerichtete Vermittlung grundlegender Methoden geistiger Tätigkeit - eine wesentliche Bedingung für methodenbewusstes Lernen (Becoming purposefully acquainted with basic methods of mental work - an essential precondition for conscious learning)
Biologie in der Schule, 31, 1982, No. 9, pp. 365-369. 1 tab.

Constant attention should be devoted to the development of active and creative thinking and doing. On the basis of three examples the author demonstrates how it is possible to introduce, excercise and apply a specific dialectical method of mental work. The first example is illustrated on the basis of the topic Annelida, the second on the basis of the topic Structural design of arthropoda and the third on the basis of the example of the topic Optimum effects of environmental factors on organisms as a prerequisite for high yields.

instruction + biology, instruction + zoology, thinking, logical methods - 147309.

58. HOPPE, H.J.:
Spiel "Mutationsgleichgewicht" (The game "Mutation Equilibrium")
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 9, pp. 278-279. 1 tab. 4 figs.

The author recommends that mutation equilibrium, as well as problems concerning evolution, population genetics, mutations and gene pools be demonstrated to pupils with the aid of a game played on a chessboard with 36 fields and with 36 white and black figures. After 60 to 80 seconds of the game, equilibrium between the white and black figures occurs. The outcome can be represented graphically.

instruction + general biology, genetics, didactical game - 147313.

6.74 Logical models in biology instruction, cybernetic models in biology instruction

59. TILLE, R. - RÖDING, J.:
Modelierung von Stoffwechselprozessen (The modelling of metabolic processes)
Biologie in der Schule, 31, 1982, No. 12, pp. 515-517.
7 figs.

The final effect of instruction concerning the metabolism essentially depends on the symbolic models used. For this reason the authors decided to analyse all published symbolic models which reflect metabolic processes. These models should be scientific, clear and understandable, they should reflect essential characteristics, be universal and logically structured. Essential characteristics should be given priority, before random or unique ones. The symbols represent input substances and products, initial and final energy states, the input, breakdown and output of matter, etc. A symbolic model of photosynthesis is provided.

instruction + physiology, photosynthesis, model - 147313.

6.75 Communist education in biology instruction

60. TEUBNER, M.:
Leitlinien und Erziehung im Biologieunterricht
(A guiding line and education in biology instruction)
Biologie in der Schule, 31, 1982, No. 12, pp. 510-515, 4 figs.

In the education of a socialist personality, educational and teaching objectives are unified. Educational objectives can be divided into those that are generally valid and those which are specific. Generally valid objectives include for instance discipline, conscientiousness, diligence, aesthetical feeling, acting in accord with a scientific worldview, etc. Specific objectives for biology instruction include for instance responsible behaviour towards the other sex, correct behaviour outdoors, in nature, hygienic behaviour, etc. The guiding line of this education includes the following: human hygiene, sexual ethics, the utilisation and conservation of nature. These areas are analysed in detail by the author, who also cites specific knowledge, convictions, opinions, etc.

instruction + biology, communist education, hygiene + + man, sexuality + ethics, nature conservation - - 147313.

6.8 Scientific education in biology instruction

61. EVSTAFIEV, E.V.:
Konkurs imeni P.A. Manteyfelya (1882-1960). (The P.A. Manteyfel (1882-1960) competition)
Biologiya v shkole, 56, 1982, No. 6, pp. 70-71.

The Ministry of Education of the Russian Federation, together with the Central Station of Young Natural Scientists and Experimental Agricultural Farms, and the Moscow Administration of the Red Badge of Labour, have announced a competition, named after P.A. Manteyfel, a zoology professor of merit, for the best work by a pupil in zoology and animal conservation. A similar competition has been organized for the last four years. Its purpose is to educate pupils towards scientific work, towards a love of nature and its conservation. The work of P.A. Manteyfel is also described. He was the director of the Moscow Zoological Gardens, studied the life of sables and contributed to their breeding in the USSR.

scientific education, nature conservation - 147313.

62. YORDANSKIY, N.N.:
Napravleniya evolutsii organizmov (The direction of the evolution of organisms)
Biologiya v shkole, 56, 1982, No. 1, pp. 20-26. 3 figs.

One of the most timely tasks in teaching evolution theory is an analysis of the causes which determine the direction which evolution takes in various groups of organisms. The author explains the term convergence, divergence and parallelism. Other authors have stressed changes in the quality of organization of living systems (evolutionary progress and regress) when explaining the phylogeny of an organism. The author describes in detail the essence and significance of natural selection, the development of the organism and evolution from the simple to the more complicated, as well as the causes of the "selection" of a specific path of evolutionary changes.

instruction + biology, scientific education, phylogeny, the development of the species - 147313.

63. JOURNET, A.R.P.:
Why reproduce ? A Demonstration of Evolution and the Origin of Life
The American Biology Teacher, 44, 1982, No. 9, pp. 543-547.
2 tabs.

One of the main objectives of general biology is to explain the evolutionary process. On the basis of a number of discussions the author has found that students do not have a complete notion of the evolution of the organic world and that their responses to specific questions tend to be lacking in certainty. For this reason the author has developed a model of evolution in which the original "soup" in the oceans which contained various organic molecules is demonstrated to students as a box full of various two-coloured spheres. When these spheres are poured into another vessel, a statistical assessment of various colour combination formed indicates the development of macro-molecules (polypeptides, nucleic acids and other polymers) under the impact of energy.

scientific education, instruction + general biology, evolution, model + macromolecular - 147313.

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64. KLOPPER, L.E.:
Editorial: Scientific and Technological Literacy for All: A National Policy ?
Science Education, 65, 1981, No. 1, pp. 1-2. Lit. 1.

An editorial concerning an important report on science and technology education in USA in the eighties which two important institutions prepared for the president of the US: The National Science Foundation and the Department of Education (S.M. Rufstedler - D.N. Langenberg: Report to the President of the United States. In: Science and Engineering Education for the 1980 and Beyond, Washington, October 1980). The report stresses the deepening of the chasm between science and engineering knowledge on the part of experts on the one hand and the general public, including politicians on the other; the latter thus influence important decisions without sufficient knowledge. Until the existing trend towards science and engineering illiteracy is reversed, important national decisions concerning science and technology will, to an increasing extent, be made on the basis of ignorance and lack of understanding. The report recommends a number of measures in the area of science and technology, education and the school system.

science education, technical education, USA - 147313.

65. ROOT-BERNSTEIN, R. - McEACHRON, D.L.:
Teaching Theories: The Evolution-Creation Contraversy
The American Biology Teacher, 44, 1982, No. 7, pp. 413-420.

The continuing contraversy between the partisans of evolution theory and creationism in the USA is difficult to understand not only for the scientifically educated but also for ordinary people. Those who advocate creationism claim it is a more valid theory than evolution theory. They claim that evolution theory has become a dogmatic world religion while "scientific creationism" is not. In their opinion it is in the powers of the state to pronounce creationism a sound scientific theory. Both progressive authors of the article cite scientific arguments against creationism and comment the problem of science and religion in American schools. They ask that students are properly informed on the differences between a scientific approach to the problems posed by the natural sciences and the approach used by fundamentalist religion.

scientifi education, atheism + education, evolution,
USA - 147313.

66. WUKETIRS, F.M.:
Biophilosophie heute - Argumente, Probleme, Perspektiven. 1. Teil. (Bio-philosophy today - arguments, problems, perspectives. Part 1.)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 2, pp. 66-67. Lit. 9.

Living nature is an increasingly difficult object of study by philosophers. Philosophical discussions on these matters are as old as philosophy itself, and various schools of philosophy have greatly influenced the development of various ways of looking at nature. After a brief period when these problems were not in the centre of philosophical interest, they are again coming to the forefront due to the recent development of biology. The article describes various aspects of contemporary bio-philosophy; its conclusions are important for biology itself but also for the interdisciplinary aspects of biology and the other natural sciences. Philosophy does not compete with biology but represents its natural supplement.

philosophy, the natural sciences, biology, interdisciplinary relations - 147313.

67. WUKETITS, F.:
Biophilosophie heute - Argumente, Probleme, Perspektiven. 2. Teil. (Bio-philosophy today - arguments, problems, perspectives. Part 2.)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 4, pp. 206-206.

To define life is very difficult. Living organisms are found in many different forms and to attempt to reduce them to a common denominator is very difficult. This is a task not only for general biology, but also for philosophy. Nevertheless, the answers which are available are.not unequivocal. Biology studies individual specific phenomena and does not attemp to formulate philosophical laws. In defining a living organism various aspects can be taken into account - theories based on metaphysics, physics, holism and others exist. The author analyses a mechanical and a vitalistic concept of life and living organisms from the point of view of system theory, which has made its most important contribution with the claim that a living system is more than the sum of its individual parts. Only a specific combination of components leads to the integration which is a prerequisite of life. All living organisms are organized in a hierarchic manner as a dynamic system in equilibrium. Among all components and subsystems of a living organism mutual interaction develops. The description of a single living organism

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is incomplete if we limit ourselves to an analysis of individual systems, without taking into account the whole. The new biophilosophy should be approached on the basis of system analysis which at the same time overcomes the barrier between mechanistic and vitalistic approaches.

philosophy, natural science, biology, interdisciplinary relations - 147313.

68. WUKETITS, F.M.:
Biophilosophie heute - Argumente, Probleme, Perspektiven, 4. Teil. (Bio-philosophy today - arguments, problems, perspectives. Part 4.)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 8, pp. 480-482. Lit. 16.

The author here discusses the problem of the hierarchic organization and the purposeful characteristics of living organisms, as well as the mutual interaction of subsystems into a single system. Ontology is a traditional part of philosophy; at present a bio-ontology is being developed. The author also discusses teleology and teleonomy. Decisive in this context is the prevailing conviction that each component of an organism serves a specific unit.

philosophy, natural sciences, biology, interdisciplinary relations, ontology, bio-ontology - 147313.

6.81 The forming of a scientific worldview in biology instruction

69. McCORMACK, A.J.:
Creationism in the Schools: The Arkansas Decision
The American Biology Teacher, 44, 1982, No. 3,
pp. 172-179.

The editors of the journal publish here the brief submitted to a district court in the state of Arkansas (USA) when a group of bishops and religious societies of various denominations sued the Education Committee of the State of Arkansas and individual professors and teachers for teaching Darwin's evolution theory. The court brief is interesting as a reflection of creationist opinions. It claims that evolution theory is not only against the Bible and against Christianity, but that it is also unscientific and impossible. Evolution serves as the pseudoscientific foundation of atheism, agnosticism, socialism, fascism and a number of other false and dangerous philosophies from the last century. The court however, ruled in favour of the defendents and in its ruling the court defined the characteristics of science.

atheism, scientific worldview, evolution, theism -
- 147313.

70. DOSTÁL, P.:
Světonázorové aspekty obecně biologického závěru
v učivu přírodopisu pro 7. ročník základní školy
(Worldview aspects of general biology conclusions
found in the science teaching syllabus for the 7th
class of basic school)
Přírodní vědy ve škole, 23, 1981-1982, No. 6,
pp. 218-220.

In the course of the last school year experimental teaching took place in basic schools according to the new concept of teaching the natural sciences. New textbooks and methodological handbooks were published for the 5th and 6th classes and the same are prepared for the 7th class. The author acquaints readers with changes in the teaching syllabus which concern biology. The textbook for the 5th and 6th class contains general biology (cell theory, genetics, evolutionary theory, ecology), which is especially important for the forming of a scientific worldview. The basic conceptual changes which have been implemented include the following: a larger number of excercises, the deletion of some sections, changes in wording, limiting the use of foreign words, etc. Also changes in the sequence of the final chapters have been carried out and a new chapter called "The organism and the environment" has been included. New terms are graphically distinguished in the text and no more than 2 or 3 are introduced each lesson. The pictures have been changed to a large extent and the majority are now in colour. The author describes in detail individual topics.

textbook, biology of man, methodological handbook -
- 147313.

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71. GOULD, S.J.:

Creationism - When You Can't Teach Honesty

The Science Teacher, 49, 1982, No. 5, pp. 7-9. 2 figs.

Darwinism is again the subject of political attacks, in spite of the fact that arguments among scientists concerning evolution have been concluded long ago. The United States is the only country in the world where creationism is still a largescale movement. Its roots are in Southern fundamentalism and political conservatism. Partisans of creationism claim that evolution is only a "theory", which not even scientists are completely sure about. The author is a progressive professor at Harvard University who here defends Darwin's theory of the origins of the species.

Darwinism, evolution, creationism - 147313.

72. HUGHES, S.W.:

The Fact and the Theory of Evolution

The American Biology Teacher, 44, 1982, No. 1, pp. 25-31. Lit. 41, 1 photo, 1 tab.

The article concerns the continuing battle in American education between Darwinists and creationists, between reactionary biblical fundamentalists and progressive teachers who uphold evolutionary theory. The article contains an interesting table of textbooks and how much space each devotes to evolutionary theory and the specific evolution of various species.

Darwinism, evolution, creationism, textbooks + biology -
- 147313.

73. KILLER, K.R.:
Special Creation and the Fossile Record: The Central Fallacy
The American Biology Teacher, 44, 1982, No. 2, pp. 85-89.

Those who hold a religious view of the creation of everything living consider their own opinions more scientific than evolutionary theory. The author compares both models and sums up arguments against creationism, especially as far as its discussion of the fossil record of prehistoric animals is concerned. Evolution is now an undisputable fact, while religious doctrine is not and never has been. The article sums up for teachers the arguments which show that modern scientific methods confirm evolutionary theory.

Darwinism, evolution, creationism - 147313.

74. LAWSON, A.E.:
Evolution, Equilibration and Biology Instruction
The American Biology Teacher, 44, 1982, No. 7, pp.394-404.
7 figs.

The author expresses his views concerning the importance of evolutionary theory in psychology as a guide for biology teaching. Equilibration is a mental process which leads to the intellect development of the individual; its theory is based on evolution theory. It assumes that intelligence is a biological adaptation of the organism to the environment. Equilibration is the counterpoint of genetic assimilation. The work of a number of scholars is quoted, among them Piaget and others.

Darwinism, evolution, psychology - 147313.

75. NAUMOV, N.A.:

Edinstvo processov formirovaniya nauchnoy kartini mira i nauchno-materialisticheskogo, ateisticheskogo mirovozreniya uchashchikhsya v processe izucheniya biologii (The unity of the process of forming a scientific image of the world and a scientific and materialistic worldview in pupils in the process of biology instruction)

Biologiya v shkole, 56, 1982, No. 4, pp. 25-32.

The basis for the forming of a scientific and materialistic worldview is learning the foundations of the sciences, both concerning nature and society, as well as learning the methodology of cognition and observing the surrounding world. In the course of their school education, pupils should acquire an image of both the natural and social, historical world which surrounds them. A scientific worldview is formed gragually in the course of their whole school attendence. The author demonstrates the forming of a scientific worldview in the course of teaching botany in the 6th class, zoology in the 6th and 7th classes, anatomy, physiology and human hygiene in the 8th class and general biology in the 9th and 10th classes. The teaching of general biology should serve as an integrating factor, which together with the knowledge gained in botany, zoology and human biology form the pupils' scientific worldview.

scientific worldview, instruction + biology, general biology - 147313.

6.811 Moral education

76. SEMENTSOVA, V.N.:
Ob opite nravstvennogo vospitaniya uchashchikhsya v processe prepodavaniya biologii (Concerning experiences with the moral education of pupils in biology instruction)
Biologiya v shkole, 56, 1982, No. 5, pp. 23-27.

Teachers in Leningrad devote a great deal of attention to improving methods of instruction and education. They attempt to improve the educational impact of instruction by stressing socialist patriotism. The most important method of moral education are a teacher's words. The author analyses how she practically implements this aspect of moral education and describes her positive experiences in this field.

instruction + biology, moral education, socialist patriotism - 147313.

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6.82 Atheistic education in biology instruction

77. BUDNAYA, O.G.:
Vsesayuznoy nauchno-prakticheskoy konferentsii "Nauchno-ateisticheskoe vospitanie - sestavnaya chast komunisticheskogo vospitaniya uchasjcjikhsya"
(The All-Union scientific and practical conference "Scientific and Atheistic Education as a Basic Part of the Communist Education of Pupils")
Biologiya v shkole, 56, 1982, No. 2, pp. 39-43.

On December 15th to 17th 1981 in Moscow an all-union scientific conference was held concerning atheistic education as a component of communist education. It was organized by the Ministry of Education of the USSR and other all-union institutions; over 300 persons participated. The main paper concerned the tasks of scientific atheist education in Soviet schools from the point of view of the resolution of the 26th Congress of the Communist Party of the Soviet Union. The conference had three sections dealing with various theoretical and practical problems, including organizational problems, the atheistical education of apprentices, its teaching in class and in extra-curricula activities, in the work of the Young Pioneer organization and in the Komsomol, etc. Special attention was paid to problems of atheistic education in the course of biology instruction and the work of the biology teacher in this context.

instruction + biology, scientific worldview, atheistic education, conference - 147313.

78. KATTCHNEKO, A.M.:

Ateisticheskaya rabota v nashey shkole

(Atheistic education in our school)

Biologiya v shkole, 56, 1982, No. 4, pp. 54-56.

The aim of atheistic education is to combat an idealistic worldview, mysticism, superstitious and religious anachronisms, while using all suitable educational influences. The approach of the teacher must of course take into acccount the age of the pupils. From the 5th to the 10th classes schools have Young Atheist hobby clubs. The author describes activities in the 8th class. He first acquaints pupils with an outline of the work to be done, which includes becoming acquainted with the history of religion, the history of the struggle between science and religion, the development of life on Earth, the development of man, of medicine against religion, of science against superstitions, of literature and art against religion. The author also describes his own experiences with hobby club work.

instruction + biology, scientific worldview, atheistic education, hobby club - 146313.

79. MUKHINA, T.K.:

Psikhologicheskiye osnovi ateisticheskogo vospitaniya shkolnikov (The psychological foundations of the atheist education of pupils)

Biologiya v shkole, 56, 1982, No. 2, pp. 14-16. Lit. 11.

One of the most important objectives in the education of pupils is the forming of their scientific worldview and atheistic convictions. The work of the teacher has an important role to play in this context: he should always take into consideration the philosophical, sociological and especially the psychological aspects of this education. Psychologists stress that young people have an increased sensitivity towards various social problems and the need to develop their intellect abilities while taking into account the ethical development of the individual and his need for practical activities. In assessing this type of education the depth of what has been learnt should be taken into account, the ability to use what has been learnt, the true nature of a person's interests and behavioural motives. Teachers should always take into account the age and individual psychological characteristics of pupils. Parents who have religious beliefs may influence their children from a very early age, while some non-believing parents neglect the scientific worldview education of their children. Only close coopetation between school and family can assure truly successful atheistic education. The article then deals with specific problems of education towards a scientific worldview and towards atheism from the point of view of various age groups.

scientific worldview, atheistic education - 147313.

80. NAUMOV, N.A.:
Metodologicheskiye osnovi ateisticheskogo vospitaniya shkolnikov (The methodological foundations of the atheistic education of pupils)
Niologiya v shkole, 56, 1982, No. 1, pp. 14-19.

An important component of communist education is education towards atheism. Scientific atheism studies the origins, essence and changes which have occoured in religion, it clarifies the methods of overcoming religion and deals with the methods of forming a scientific worldview. The founders of scientific atheism are K. Marx and B. Engels, who studied the origins and essence of religion extensively. The author deals with the basic methodological principles of an atheist education, which include Party committment, a scientific approach, a specifically historical approach, the principle of dialectical unity between the positive and critical aspects of atheism, a comprehensive and differentiated approach and coordination. The main thrust of atheist education is the teaching of atheistic knowledge to pupils. On the basis of the example of various teaching subjects the author analyses their specific contribution to the achievement of these objectives.

scientific worldview, atheistic education - 147313.

6.83 Education towards socialist patriotism and proletarian internationalism in biology instruction

81. BABISHIN, L.S.:
Ob opite internattsionalno-patriticheskogo vospitaniya uchashchikhsya v processe vneklassnoy raboti po biologii (On experiences with internationalist and patriotic education in the coarse of extracurricula activities in biology)
Biologiya v shkole, 56, 1982, No. 5, pp. 69-70.

The author deals with the activities of a young nature science hobby club in the Ivan Franko region. He specifically describes how various aspects of internationalist and patriotic education were included into biology topics. Examples of the work done by various hobby clubs is described in detail and includes for instance learning about nature in the motherland, which enhances pupils' feeling of patriotism.

biology instruction - hobby club - socialist patriotism, proletarian internationalism - 147313.

82. FRITSCH, R. - FRITSCH, H.:
Fakten, Wetungen und Orientierungen des X. Parteitages in den Biologieunterricht einbeziehen ! (Use the facts, evoluations and orientations arrived at by the Xth Congress of the Socialist Unity Party of Germany in biology teaching !)
Biologie in der Schule, 31, 1982, No. 1, pp. 37-39.

On the basis of the directives of the Ministry of Education concerning the utilization of the documents of the Xth Party Congress, the authors have drawn up an outline of this utilization based on the biology teaching syllabus. The outline is divided according to different classes and topics in a very specific manner: the number of the topic and the pages of the Congress documents for each class are cited.

instruction + biology, Ministry of Education, teaching syllabus, topics, conclusions + 10th Congress Socialist Unity Party of Germany, GDR - 147313.

83. HASS, G. - HASS, R.:
Sozialistische Rechterziehung - auch eine Aufgabe des Biologieunterrichts (Socialist legal education - also one of the tasks of biology instruction)
Biologie in der Schule, 31, 1982, No. 12, pp. 506-509.

In dealing with problems of legal education we should take into consideration that socialist legal education is based on knowledge, without which a change in behaviour cannot be achieved. The subject-matter of biology instruction in a number of cases makes it possible to introduce elements of legal education. The author illustrates this on the basis of the subject-matter taught in the 7th to 10th classes which mostly concerns human biology and nature conservation.

instruction + biology, human biology, nature conservation, legal education. - 147313.

84. HICEMANN, F.M.:
Education for Citizenship: Issues of Science and Society
The American Biology Teacher, 44, 1982, No. 6,
pp. 358-367. 3 figs.

Are student well prepared by school for dealing with the issues and problems of society as good citizens ? Will they understand and be able to take a stand on the very complicated problems of society and public life, if they are not properly trained to do so in school ? The author deals with these questions within the framework of civics and biology instruction. A pressing problem in this context is nature conservation and environmental control , which do not concern only the legal and legislative systems, but also a knowledge of natural laws. Ecological equilibrium on Earth is seriously threatened by the year 2000. By improving the quality of instruction in general and biology specifically this situation may yet be averted and this is a primary task of school authorities and teachers alike.

instruction + natural sciences, civics, nature conservation, environmental protection - 147313.

85. LEONTEVA, M.E.:
V peredi god udarnoy raboti (A year of pressing work is before us)
Biologiya v shkole, 56, 1982, No. 4, pp. 3-5.

In the forthcoming school year the 60th anniversary of the fouding of the USSR will be commemorated and a plenary meeting of the Central Committee of the Communist Party of the Soviet Union will take place. Also biology teachers will contribute to the celebrations of these events and thus implement the conclusions of the 26th Congress of the CP of the SU. The author describes the successes achieved in the field of education in the USSR: among others, 90 million persons in the USSR have gained secondary education. Preparations for the celebrations of the 60th anniversary of the Soviet Union are described in detail. One of the tasks of biology instruction is to stress vocational guidance towards chosing an occupation in agriculture.

instruction + biology, socialist patriotism, teaching syllabus - 147313.

86. O podgotovke v obshcheobrazovatelnikh shkolakh k 60-letiyu obrazovaniye Soyuzna Sovetskikh Sotsialisticheskikh Respublik (Concerning preparations for the celebrations of the 60th anniversary of the founding of the Union of Soviet Socialist Republics in general education schools)
Biologiya v shkole, 56, 1982, No. 3, pp. 3-5.

This is a circular letter sent by the Ministry of Education of the USSR to the Ministries of various Union Republics providing methodological instructions for preparations of the celebrations of the 60th anniversary of the founding of the USSR in schools.

Various educational aspects are analysed and in this context the following themes are stressed: proletarian internationalism, fraternal relations among the nations of the USSR, the peace policy of the USSR and love of the socialist motherland. Teachers should explain to pupils the successes achieved by the national economy in the years of Soviet power; meetings with direct participants in the Great Patriotic War and the building of socialism are recommended. Various methodological aspects concerning the age of the pupils in question in relation to these meeting are discussed.

instruction + biology, Ministry of Education, USSR, proletarian internationalism, patriotic education - - 147313.

87. SMIRNOV, A.V.:
Nashe znaniye, sila i oruzhiye (Our knowledge, strength and weapon)
Biologiya v shkole, 56, 1982, No. 2, pp. 66-69.

The books of V.I. Lenin have had an enormous influence on the whole of mankind. They have even been published by UNESCO. The international meeting of Worker and Communist Parties in 1969 stressed the huge importance of the books written by V.I. Lenin. Therefore in schools the ideas of V.I. Lenin should be made maximum use of in educating youth. They provide basic knowledge for life, they contribute to the forming of moral and ideological attitudes and the personality of each individual. The article contains a bibliography for the work of hobby clubs and the work of every teacher.

V.I. Lenin, instruction + biology, socialist patriotism, proletarian internationalism. - 147313.

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88. Sovetskiye uchonie - narodnomu khosyastvu strani
(The contribution of Soviet scientists to the national economy of the country)
Bilogiya v shkole, 56, 1982, No. 3, pp. 13-16.

This year we shall be celebrating the 60th anniversary of the founding of the Soviet Union. During the sixty years of constructing socialism, many successes have been achieved. It is the task of teachers to acquaint pupils with specific examples of the successes of the socialist national economy and thus to strengthen their conviction concerning the correctness of the taken path. This task can also be found in the instructional and methodological letter sent by the Ministry of Education of the USSR "On Preparations for Celebrations of the 60th Anniversary of the Founding of the USSR in General Education Schools". This task is also important for biology teachers. For this reason the article contains information on various interesting scientific findings in biology, such as for instance the success achieved by various research institutions in the Union Republics and how they have been practically utilized.

socialist patriotism, science, Ministry of Education, methodological instructions - 147313.

89. Sovetskiye uchoniye - narodomu khosyastvu strani
(The contribution of Soviet scientists to the national economy of the country)
Biologiya v shkole, 56, 1982, No. 4, pp. 17-20.

In a developed socialist country the whole national economy develops in a comprehensive manner. This takes place on the basis of friendship among the nations of the USSR. The economy of each Republic has a specific contribution to make to the whole. For instance molecular biologists and genetists have developed a virus-less potato in a test tube, scientists have been successful in making vitamin B_{12} with the aid of micro-organisms cultivated on sugar refinery waste and this vitamin has in turn been used to improve the breeding of farm animals. Also the production of high-protein animal fodder with the aid of bacteria has been developed. This production requires only carbon and energy. Microbiologists have also described a new specie of bacteria, which makes it possible to clean polluted water of chromium salts. Another type of bacteria is capable of degrading and neutralising chemical substances in polluted waters. Another example concerns 143 different medicinal, decorative and fodder producing plants which are now cultivated in Yakutsk and new strains of winter wheat which have been developed. The problem of cleaning polluted air has also been solved, as well as methods of combating the potato bug with its natural enemies; a number of pheromones have been synthesized; complex automatic soil analysis station has been developed; pestacides on basis of pine resins which have an anti-fungal effect have been developed. Thus each of the Union republics has contributed to the development of science and the national economy.

science, national economy, socialist society, socialist patriotism - 147 313.

6.831 Education to peace in biology instruction

90. DANELIUS, D.:
Kriegsgefahren - Argumente für Biologielehrer
(The danger of war - arguments for biology teachers)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 273-278.
2 tabs.

The words of the Secretary of State of the US that there are more important things than peace came as a shock to the whole world. Scientists and the examples of Hiroshima and Nagasaki have provided ample warning (the increased incidence of leukemia, lung cancer and other tumors, etc). The author also mentions the danger of the neutron bomb where damage is done by physical interaction between neutrons and the atoms in an organism. Ionization occurs which causes further damage, which the author describes in detail.

instruction + biology, education + peace, atomic war - 147313.

91. Menschen als Versuchskaninchen (People as guinea pigs)
Biologie in der Schule, 31, 1982, No. 11, pp. 491-492)

Among the preparations the US is making for atomic war are experiments which aim at determining the resistance of humans towards radiation. For instance at a clinic in Cinncinnati, 87 patients were exposed to radioactive radiation and experimented with as if they were guinea pigs or rabbits. American physicians already in 1954 applied Plutonium 239 to 18 patients aged 4 to 19 years. At the beginning of the fifties American soldiers were exposed to radiation after the explosion of an atomic bomb in the Nevada desert. In the period 1960-1974,89 cancer patients at a clinic in Tennessee were exposed to radiation by the whole body, not only the site of the afflicated organ. In the years 1963-1973, 131 prisoners in Washington and Oregon were exposed to lethal doses of radiation.

education + peace, atomic war, experiments + humans - 147313.

92. Neutronentherapie ja - Neutronenbombe nein, Danke ! (Neutron therapy - yes, neutron bombs- no thank you !) Biologie in der Schule, 31, 1982, No. 10, pp. 401-402.

This article continues in the subject-matter begun in an article published in issue No. 7-8. It first answers the question of the source of information concerning the effects of neutron radiation: part of the radiation caused by the atomoc bombs dropped on Hiroshima was formed by neutrons, a number of experiments with animals have been done and finally, applications of neutron radiation for medical purposes has yielded valuable findings. The first applications in medicine date back to 1940. The dangers posed by neutron radiation for the cell are, among others, in the damage done to the reparation abilities of the cell.

education + peace, neutron bomb - 147313.

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6.84 Work education in biology instruction

93. MITINA, P.N.:
Izpolzovaniye samostoyatelnikh rabot v kachestve istochnika polucheniya novikh znaniye (The utilization of independent assignments as a source of gaining new knowledge)
Biologiya v shkole, 56, 1982, No. 1, pp. 36-39.

In the introduction the author stresses that teaching pupils to work independently is one of the most important tasks of the teacher. She then analyses her own experiences and those of her collegues, as far as the organization of a lesson in which pupils do independent assignments is concerned. These include a botany lesson, where pupils are given assignments concerning the metamorphosis of the potato tuber and onion. Also laboratory work concerning tubers and onions is described. Other examples concern the topics natural selection, the zoology of invertebrates, etc. Special attention is paid to the increased attention to pupils who are behind or are less gifted. This is an effective and modern teaching method, which should receive greater attention than has been the case.

instruction + zoology, modernization - 147313.

6.841 Independent work done by pupils in biology instruction

94. RUTE, M.A.:
Nekotoriye usloviya effektivnosti opitnicheskoy raboti
(Some aspects of efficiency in doing experiments)
Biologiya v shkole, 56, 1982. No. 1, pp. 63-64.
2 tabs.

The author discusses the organization of independent experiments done by pupils on school experimental plots of land. He describes the best organization of various stages of the pupils work, such as determining the objective of an experiment, carrying out the experiment and assessing it. He recommends giving assignments in writing and discusses various aspects of this work in different classes.

independent work + pupil, school plot of land - 147313.

6.851 Education towards economizing in biology instruction

95. YAKHYAYEVA, M.I. - KADIROVA-YURCHENKOVA, R.N.:
O vospitanii berezhivosti (On educating thriftiness)
Biologiya v shkole, 56, 1982, No. 4, p. 65.

A biology teacher from the Tadzhik Soviet Socialist Republic informs readers about how he educates pupils towards thriftiness and a correct attitude towards the economy of their native region. He does this, among others, by making bulletin boards about nature conservation, showing lists of threatened plants and animals; he also cooperates with the zoological gardens in Dushanbe in organising annual exhibitions called The Gifts of Nature, where the scope of flora and fauna in local nature is shown. Also activities aimed at saving and economising bread have been very successful.

education + efficiency, instruction + biology, nature conservation, zoological garden, exhibition, biological activities - 147313.

96. SHABALINA, E.A.:
Vospitanie u shkolnikov bereshlivosti na urokakh botaniki (Education towards thriftiness during botany lessons)
Biologiya v shkole, *56*, No. 4, pp. 40-44.

The author considers various opportunities which botany instruction provides for educating pupils towards thriftiness. He provides a number of suggestions especially in relation to agricultural products, food, furniture as a product of the woodprocessing industry, towards the soil and combating disease and pests. For instance if pupils will pass on their textbooks undamaged to their young school-mates, they will save 30 000 trees 60 to 80 years old; for obtaining 1 kilo of cereals, 3 square meters of soil must be cultivated, for making 1 kilogram of sugar, 10 kilograms of sugar beet are required, etc.

instruction + botany, education + thriftiness, food-processing industry, wood-processing industry - 147313.

6.85 Polytechnical education in biology instruction

97. CALZOLANI, S.:
Educazione tecnica: alcune idee di origine francese, riguardo ai metodi didattici (Technical education: some ideas of French origin concerning didactical methods)
Scuola e didattica, 26, 1980-1981, No. 4, pp. 15-16.
1 fig., lit. 2.

The article on the one hand criticises a new curriculum introduced in French general education secondary schools which includes, besides the "physical sciences" and "natural sciences" (which together form the "experimental sciences"), also an entirely new subject called "manual and technical education". The author's criticism concerns the fact that practical education (for instance the making of models, etc.) is separated from theoretical knowledge, also the fact that there is a shortage of trained teachers for the new subject, as well as teaching material. On the other hand the author stresses the positive aspects of stressing technical education.

polytechnical education, France, general education secondary school - 147313.

6.86 Aesthetical education in biology instruction

98. SANDNER, D.:
Das Tier in der bildenden Kunst (Animals in the visual arts)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 342-347. 8 pictures.

The author provides a brief summary of the development, forms and specific aspects of the artistic rendering of animals in art, from pre-historic times until the present. He describes outstanding painters and deals in detail with eight of them.

instruction + biology, aesthetical education - 147313.

99. ZORN, G.:
Über die Möglichkeit der ästerischen Erziehung im Biologieunterricht (On opportunities for aesthetical education in biology instruction)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 319-321.

Aesthetical education provides an opportunity for improving the quality of instruction and its contribution to communist education. Aesthetical education should be developed in unity with cognition and evaluation, but evaluation assumes the development of pupils' interests and their active approach to study. The author considers the essence of aesthetical activity to be the participation of all forms of perception in cognition. In practical activities this assumes a synthesis of cognition and experience, reason and emotion. What pupils like also stimulates their desire for cognition. In conclusion the author mentions various topics which make use of art reproductions in the course of instruction.

instruction + biology, aesthetical education - 147313.

6.87 Education towards nature conservation and environmental control in biology instruction

100. ALEKSANDROVA, M.S.:
El Glena (The Glen Pine)
Biologiya v shkole, 56, 1982, No. 6, pp. 80.

Petr Petrovich Glen discovered in the south of Sakhalin a specie of pine which later was named after him the Glen pine (Picea glehnii). It is found on Sakhalin, as well as in the vicinity of the Amur river and on the islands of Uturup and Shikotan. Beyond the borders of the USSR it is found only in northern Japan, on the islands of Hokkaido and Honshu. It grows to 17 meters in its northernmost sites, but achieves 40 meters height on Hokkaidu, with a trunk diameter of 140 cm. The author describes this rare pine tree, which is now protected by law. It is also being planted in other areas of the USSR; the dendrarium of the botanical gardens belonging to the Academy of Sciences of the USSR in Moscow has 119 of these pine trees.

nature conservation, plant conservation, USSR - 147313.

101. ALEKSANDROVA, M.S.:
Listvennitsi (Larch trees)
Biologiya v shkole, 56, 1982, No. 1, pp. 73-74.

The author provides basic information about the genus of Larix or larch trees, which are now in the

Red Book of the USSR. She describes their various species and how they are represented among the conifers of the USSR. Also how they are cultivated and their economic importance are discussed (especially the species Larix olgensis and Larix decinua).

nature conservation, coniferous trees, USSR - 147313.

102. ALEKSANDROVA, M.S.:
Pikhti (Fir trees)
Biologiya v shkole, 56, 1982, No. 5, pp. 79-80.

Fir trees are gymnosperms of the family Pinaceae and are widely disseminated all over the Northern Hemisphere. The genus Abies includes more than 40 species, of which 9 grow in the Soviet Union (in Siberia, the Far East and the Caucases). The most frequently found is Abies sibirica, Abies sachalinensis, and Abies nordmanniana. Three species of firs are now on the list of protected plants. These species are described in greater detail by the author.

nature conservation, conifers, USSR - 147313.

103. ALTMANN, A.:
Nové prostředky biologického boje proti chorobám a škůdcům (New means of biologically combating disease and pests)
Přírodní vědy ve škole, 33, 1981-1982, No. 4, pp. 134-135.

In biologically combating disease and pests, antagonistic fungi can be used against other kinds of fungi: for instance Trichoderma is used against Botyritis cinerea which attacks the fruit of strawberry plants. Spores of Trichoderma are put into fungicides and some can be put directly into food to prevent the development of various fungi.

biologically combating fungi, fungicides - 147313.

104. ALTMANN, A.:
Sovy a pesticidy (Owls and pestacides)
Přírodní vědy ve škole, 33, 1981-1982, No. 6, pp. 220-221.
8 photos on cover.

The use of pestacides and insecticides has led throughout the world to the extinction of whole populations of owls and birds of prey who are highest in the food chain or at the top of the food pyramid: producers and consumers of the 1st order (herbivores) - consumers of the 2nd order (carnivoures) - destructors. DDT leads to the development of damaged egg shells and leads to the disintegration of steroid hormones. These chemicals are solvable in fats and accumulate in the fatty layers of an owl's or bird's of prey body; in the winter, when the birds are hungry and assimilate their own fat stores, owls and birds of prey suddenly die of poisoning with a seemingly unknown cause.

birds, conservation of fauna, insecticides, pestacides, food chains - 147313.

105. BLAIR, H.S. et al.:
Eradication of the Algicidal Properties of Copper and Mercury Ions by Chitin and Chitosan
Journal of Biological Education, 16, 1982, No. 1, pp. 73-75.
7 figs.

A team of authors describes an experiment whose purpose it was to decrease the toxic effects of metals with the aid of chitin and of chitosan produced on its basis. The experiments were carried out on growing Chorella algae cultures which contained various quantities of toxic metals. The experiments showed that while the presence of copper and mercury in the algae prevented their growth, the presence of chitin or chitosan decreased the toxic effects of the metals when their quantity is over 10 mg/dm^3. The experiment is summed up in various diagrams which show the course of changes in toxicity in relation to changes of the quantity of metals and/or chitin and chitosan.

experiment, metals, toxicity - 147313.

106. BOHÁČ, D.:

Životní prostředí jižních Čech a jeho ochrana
(The environment in southern Bohemia and its conservation)
Přírodní vědy ve škole, 33, 1981-1982, No. 8, pp. 285-287.
Lit. 9

The article briefly describes the natural environment of the South Bohemian region, which can be divided in three distinct areas: the České Budějovice basin and the vicinity of Třeboň with the foothils of the Šumava mountains and of the Novohradský mountains; the edge of the Czech-Moravian highlands and the Central Bohemian hills, and finally the Šumava and Novohradský mountain ranges proper. The author discusses nature conservation measures and environmental control in the area and also the protected areas found here - Šumava and the vicinity of Třeboň. Various institutions cooperate in this work, such as the State Nature Conservation Administration, the South Bohemian Regional National Committee and the Biological Institute of the Czechoslovak Academy of Sciences, as well as others. Special problems are posed by recreational facilities in the area, agricultural production and land reclamation work, etc. Also the flora and fauna of the region are discussed.

environment + control, South Bohemian Region, protected natural areas - 147313.

107. BOWKER, S.W.:
Biological Indicators of Stream Pollution
The School Science Review, 63, 1982, No. 24, pp. 469-472.
3 tabs.

Ecological studies carried out in the vicinity of polluted streams in towns are a popular component of biology instruction in secondary schools and can provide students with much useful knowledge for the study of biology. The author describes a method for determining the scope of pollution in urban streams by determining the absence of small aquatic fauna and their larvae, which are otherwise always present in flowing waters. Tables sum up the names of these groups of fauna, as well as the findings of an analysis of bio-indicators. A practical example of methodological procedures is also included.

environmental control, water pollution - 147396.

108. BUSCHENDORF, J.:
Tierschutz als Erziehungsziel im Biologieunterricht - aktuell und notwendig (A timely and necessary educational aim of biology instruction - the conservation of fauna)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 316-318.

The author describes negative aspects of working with animals and discusses means of overcoming them. In this context problems concerning the legal protection of animals are interesting. The author sums up and cites various laws and regulations, because in the G.D.R. there is no single law dealing with this problem.

nature conservation, fauna conservation, legal aspects, G.D.R. - 147313.

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109. CLARK, T.K.:
Incorporating Land Use Planning Into the Environmental Science Curriculum
The American Biology Teacher, 44, 1982, No. 3, pp.164-167.
2 figs.

In view of population growth and other aspects of urban life in the post-war period, land-use planning has become a necessity, otherwise mankind will find itself up a blind alley. The author discusses the problem from an educational point of view and how this subject-matter should be included into the environmental sciences curriculum. The syllabus should include discussions on the natural environment (parks, forests, water areas, etc.), the urban environment (houses, communication and transportation systems, population density, greenery, etc.), problems connected with the growth of a model city (Carson City) and developing a model land-use plan for a city with 100 000 inhabitans.

environmental control. environmental conservation -
- 147313.

110. ČEŘOVSKÝ, J.:
Kritický ohrožené druhy květeny ČSR (Critically threatened species of flora in the Czech Socialist Republic)
Přírodní vědy ve škole, 33, 1981-1982, No. 8, pp. 287-289.
17 photographs, lit. 9.

Pupils in school and young people in general should fully participate in nature conservation. Flora which is critically threatened is listed in the so-called Red Book. The extinction of any specie is considered to be an irreplacable loss for science, culture and the economy. In the Czech lands a total of 267 taxons have been declared as critically threatened. These include for instance practically all the

Orchidaceae. Care and attention should be given especially to marshland and shallow waters, which are among the most threatened types of biotas in this country. In conclusion of the article the author provides various suggestions for the work of school biology hobby clubs and work within the framework of biology instruction concerning various species of threatened plants.

education towards environmental control, environmental control, hobby clubs, biology activities - 147313.

111. ČTYŘOKÝ, P.:
Ptáci velmi ohrožení (Birds which are highly threatened)
ABC mladých techniků a přírodovědců, 28, 1982, No. 20,
pp. 6-7.
2 photographs

The Sand martin (Riparia riparia) is among the most threatened birds. It makes its nest in the sandy banks of rivers or in sand quarries and sandstone formations. The author describes this bird's biology, its nesting habits and the way it rears its young. The key to its conservation is a protection of the places where these birds can build nests. The author describes experiences from the town of Radotín, where a new port for river barges was built. The birds at the same time were given a new bank where they will be able to build nests, in place of the bank they lost. The same should be done in sand quarries - allow the birds to make nests at new sites when an old site is disturbed due to the operation of the quarry.

nature conservations, birds, biological activities - - 147313.

112. DIRCKSEN, R.:
Der Mensch nutzt und gefährdet den Lebensraum
(Man makes use of the environment and threatens it)
Naturwissenschaften im Unterricht - Biologie, 30, 1982,
No. 5, pp. 193-199.
6 figs., 1 worksheet.

The North Sea is important for man as a fishing site and also for recreational purposes. The coast of the North Sea has become highly industrialized, especially during recent years and this is beginning to represent a danger to the natural environment in the area. The author discusses the problems, history, present and future of fishing in the North Sea, especially in its mud flats. In the period 1909-1938 the average fish catch in the mud flats was 1 to 1.5 million tons, from 1946-1961 1.2 to 2 million tons. A total of 250 different specie of fish live in the North Sea. For students it is important to study their life cycle and how they reproduce and spawn. The author describes in detail the biology of the plaice, ellpout, the gunnel and the sculpin. Also fishing for shrimp in the mud flats is described. The author stresses problems of the natural environment in the mud flats and its conservation.

nature conservation, environmental control, the North Sea, FRG - 147396.

113. DONÁT, P. - SEDLÁČEK, K.:
Kritéria pro hodnocení ornitofauny a Červený seznam ohrožených druhů ptáků v ČSSR (The criteria for assessing ornithological fauna and the Red list of threatened species of birds in Czechoslovakia)
Památky a příroda, časopis státní památkové péče a ochrany přírody, 7, 1982, No. 7, pp. 423-438.
57 figs.

The authors discuss the criteria for assessing ornithological fauna and those birds which are included into the Red list of threatened species. Their criteria are the outcome of a critical analysis of the existing situation: specie diversity is continually declining and some species are disappearing entirely from various territories. The number of threatened fauna is increasing every year. The authors accept the principle furthered by the International Union for the Conservation of Nature and Natural Resources, that every species should be saved and special measures taken for the protection of threatened species. In the article they attempt to identify those species which are threatened most. The same system and principles have already been used to identify the most threatened species of flora (by J. Čeřovský). For each threatened specie listed, the authors discuss opportunities for preventing further losses, support to almost extinct individual animals, possibilities for their resettlement in a new locality and support to international programs for bird conservation. For each criterion, the authors cite data on the present incidence of the birds, the conditions required for nesting, ecological traits of various species, their zoo-geographical characteristics and the international aspects of conservation.

nature conservation, environmental control, birds, Red list - 147313.

114. DYKYJOVÁ, D.:
Chráněná oblast Třeboňsko (The protected area in the vicinity of the town of Třeboň)
Přírodní vědy ve škole, 33, 1982, No. 5, pp. 166-168.
11 photos on cover, lit. 4.

In 1978 the surroundings of the south Bohemian town of Třeboň were made into a protected area. Two years previously, UNESCO included this area into the International Biosphere Reserves because it includes marsh areas, as well as blown sandy areas with flora and fauna typical for such places; it also contains genetically rare flora and fauna and species which testify to extensive evolutionary changes in past geological eras; its mars hes and ponds are an important resting place for migrating aquatic and shore birds. Many bird species winter here and build their nests. The area contains 10 small reservations, including the international bird reservatiom Velký a Malý Tisý. The landscape has been strongly influenced by human intervention since the 13th century. The State Historical Monuments and Nature Conservation Administration has extensive and diffioult tasks in the area. 51.6 % is formed by forests (it is assumed that this figure will reach 60 % in the future), while agricultural land is equal do 36.2 %, fish ponds 11.4 % and peat bogs 9 %. Of the original forests only remnants of fir and beech forests have remained. The abundance of water gives the area a marsh-like landscape, approximately 40 % of annual rainfall is found in the waters and marshes of the area. Details concerning the flora and fauna of the area can be found in the final part of the article.

nature conservation, environmental control, UNESCO, protected landscape area - 147313.

115. DYLLA, K.:
Igeltod auf der Strasse (The death of a hedgehog on the highway)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No.8, pp. 245 - 246.

The article continues in the subject-matter of an article written by Poduschka, W.: Zur Biologie des Igels - Bedrohungen, Schutzmassnahmen und Überlebenschancen, published in Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 8, pp. 247-252. It provides 5 assignments concerning the problem of the killing of hedgehogs caused by automobile traffic on roads. Pupils are asked to make graphic representations and if possible statistical assessments. The article provides comparisons between Bavaria and Sweden from this point of view. The assignments can be used in biology instruction or for the written part of the school-leaving examination.

nature conservation, animal conservation, insectivores, automobile traffic - 147313.

116. DYLLA, K.:
Kursarbeit: Artenschutz (Term paper on specie conservation)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 8, pp. 228-233.
2 figs.

The article demonstrates the properties of a very good project for the written part of the school-leaving examination, which draws upon knowledge in physiology, ecology, genetics and evolution, as well as skills needed to organize work properly and prepare a report. On the basis of two examples the author shows the difference between the factual and formal dealing with a problem. Specifically the author uses the examples of the butterfly Parnassius mnemosyne, which pupils must first learn to distinguish from the Appolo butterfly (Parnassius apollo). The former feeds on the plant Corydalis cava. A method of conserving this butterfly might be to cultivate this plant, capture at least 30 specimens of the butterfly and then set them free on the plot where the plants are cultivated. The pupils are asked to decide whether this is a good method of conserving the specie in question.

nature conservation, conservation of fauna, school-leaving examination, written assignment - 147313.

117. DYLLA, K.:

Kursarbeiten: Hecken in der Kulturlandschaft

(A course assignment: Hedges in the cultural landscape)

Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 6, pp. 178-183.

Lit. 3, 3 worksheets.

In the final class of secondary school pupils receive two assignments on the topic of hedges in a cultural landscape. Both contain various types of problems (analytical, synthetic, dialectical) and some require the use of skills in reproduction and organization. The pupils study the forming of a niche, the adaptation of the plant louse Aphis sambuci to the gylucide sambunigrin in food and the adaptation of the lady bug Adalia bipunctata or Coccinella septempunctata to plant lice which have been sucking on wild elder shrubs. The experiments indicate that the former ladybug is perfectly adapted to eating plant lice which feed on elder, but the latter ladybug is not adapted to this food; according to the number of elder-eating plant lice in the food of Coccinella spetempunctata, either its gonads do not mature or its larvae cease to develop and up to

100 % of the larvae and bugs die. On this basis pupils are asked to explain why the elder plant lice is able to survive on this plant and why both humans and birds who eat wild elder berries or their blooms do not suffer any damage. Wild elder in the digestive system of some insects is chemically disintegrated to hydrogen cyanide which is very poisonous.

nature conservation, environmental control, secondary school, interdisciplinary relations, written assignment - 147313.

118. DYLLA, K.:
Problemfeld Natur - und Umweltschutz im Ökologieunterricht der Sekundarstuffe II. (Problems of nature conservation and environmental control in instruction in the upper classes of secondary school)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 8, pp. 225-228.
1 fig.

The article provides instructions on how to teach the topics cited in the title in the form of problem teaching. The ethical and political aspects of the subject-matter are stressed. Practical nature conservation activities on the part of pupils are very important in this context.

nature conservation, environmental control, secondary schools, problem teaching - 147313.

119. DYLLA, K.:

Zur Abhängigkeit der Zahl überfahrener Igel von der Art des Biotops (The dependency of the number of run over hedgehogs on the type of biota)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 8, p. 246.

The author discusses the problem of the number of hedgehogs run over by cars on roads, in relation to the type of biota - such as the vicinity of a housing estate, fields, meadows, forests etc.; also the size of settlements is an important factor.

nature conservation, conservation of fauna, biota, automobile traffic - 147313.

120. EICHBORN, G.H.:

Neue Perspektiven für den Biologieunterricht ?
(New perspetives for biology instruction ?)
Der Biologieunterricht, 18, 1982, No. 2, pp. 20-22.

The author calls upon all educators in the FRG to take a stand against projects which will alter the landscape, as well against modern agricultural production which uses chemicals to poison the soil, fields, the environment and food by poisons found in insecticides, pesticides, herbacides and artificial fertilizers. Present day agriculture has forgotten how to fertilize with humus, by alternating crops, etc. This is a tragedy not only for biology as a science, but also of the science of agriculture. Agriculture is destroying natural ecosystems, is insensitive to the methods used for breeding farm animals on a large scale (the breeding of chickens in cages is considered by the author to be a crime), uses risky pharmaceutical products and is the source of one poison scandal after another.

If this trend continues, then young people must be prepared to live among mountains of waste, with polluted water, with soil which carries a cement layer and with food which is cheap but a health hazard, while the countries of the third world go hungry anyway. Schools should take a critical stand on all this and arouse youth to change the existing negative situation.

instruction + biology, environmental control, chemization of agriculture, insecticides, pestacides, herbacides, fertilizers - 147313.

121. ERZ, W.:
Arbeitsweise der Umweltschutzverbände und deren Angebot für die Umwelterziehung in der Schule (Methods of work used by the Association for Environmental Control and its offer for environmental control education in schools) Der Biologieunterricht, 18, 1982, No. 2, pp. 61-70.

Associations for Environmental Control in the FRG have over 3.3 million members. Endeavours to control the environment have existed in Germany for a long time, the first date back to one hundred years ago. The most important part of the work done by the Association is to mediate and act as a spokes-man in environmental policy problems and to collect and assess data required for a study of the environment. The organization draws up annual plans for environmental control, as well as for practical activities connected with it; they also aim at educating the public in environmental policy matters. Cooperation with schools is an important component of the Association's work. This cooperation can have the form of various teaching projects, organizing the participation of youth for instance in mapping various biotas, in work aimed at the conservation of threatened species, etc.

enviromental control, hobby club activities, cooperation with secondary schools, FRG - 147396.

122. FALKENHAHN, H.H.:
Zum Verhältnis von Naturschutz und Jagd (Concerning the relation between nature conservation and game-keeping) Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 7, p. 221.

The author is a nature conservation officer in the Würzburg region and at the same time for 30 years an active game-keeper. In this article he expresses his opinion concerning an article by SCHULZ-KÜHNEL, U. published in issue No. 1 of this journal. The problem concerns mostly whether or not game should be fed. The author does not agree with the opinion stated in the cited article, that it is wrong to feed forest animals in the winter, because this has a negative effect on the numbers of animals. Previously deer would come down into valleys and there found sufficient food in the winter, but now people have taken over all the valleys and deer no longer have this possibility. Also in earlier times the number of roes was regulated by predators. Now large predators no longer live in European forests so that in the roe population also weak individuals survive, as well as those which are too old. Hence the regulation of the roe population must be carried out by game-keepers, who shoot weak and old individual roes and thus help the healthy and strong animals to survive.

nature conservation, game-keeping, population + animals, - 147313.

123. FINGERLAND, K.:
Životní prostředí a škola (The environment and schools)
Přírodní vědy ve škole, 33, 1981-1982, No. 7, p. 258.

A nationwide seminar concerning education towards environmental control was organized by the Pedagogical Research Institute in Hradec Králové on September 17th and 18th, 1981. The main papers were presented by outstanding educators and were aimed at specific problems concerning the environment, comprehensive education concerning the environment, feedback relations between this education and the ecological environment and preparations for further education in this area. Other papers dealt with experiences gained in this education.

environmental control, seminar, education towards conservation and the forming of an environment - 147396.

124. FLANNERY, M.C.:
Armadillos Can Come in Handy
The American Biology Teacher, 44, 1982, No. 4, pp. 225-236.

A university biology instructor here discusses the problems connected with the conservation of the armadillo, of which approximately 20 million live in the USA. The cause of interest in these animals is the fact that a anti-lepra vaccination is now made from armadillo blood. Lepra is caused by the bacterium Mycobacterium leprae and approximately 10 million people throughout the world suffer from the disease. Annually 200 000 new acute cases are reported. Of the genus Armadillo, only one specie - Dasypus novemcinctus - is suitable for making the vaccine. The biology of this specie and some interesting physiological characteristics of this animal, such as its low body temperature are described. It is interesting that this animal is the only one be-

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sides man which suffers from lepra. The author expresses her opinion that this particular specie is threatened by extinction and this would at the same time threaten the so far successful treatment of lepra.

nature conservation, fauna conservation, USA - 147313.

125. FRANZ, R.:
Umweltschutz zur Gewährleistung einer hohen Effektivität der Volkswirtschaft der DDR (Nature conservation for assuring the high efficiency of the national economy of the GDR)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 337-371. 1 tab.

The gradual forming of closed cycles in the circulation of matter in agriculture which at the same time utilize all waste, is one of the most important methods of assuring the conservation of the environment and moreover economizing natural resources. What was formerly waste is, to an increasing extent, utilised: for instance sulphur dioxide, molasses, sulphite waste liquor, ash, old rubber tyres, etc., which can all be used in productive processes. The author cites various examples and also describes the outcome of international cooperation in this area.

environmental control, waste, productive processes - 147396.

126. FRONĚK, J.:
Mějme rádi zvířata (Lets like animals)
Přírodní vědy ve škole, 33, 1981-1982, No. 3, p. 90.

The journal Rodina a Škola (The family and schools) has announced an annual competition for pupils in schools called Lets Like Animals. The competition concentrates on the new school curriculum for basic schools. Its stress is on nature conservation and environmental control, as well as on the study of ethology and ecology. The competition is organized into 10 rounds in which pupils become acquainted with 10 Czechoslovak zoological gardens. A precondition for participation in the competition are tickets from visits to the zoo in the period between March 1981 and the end of 1982. The assignments given in the competition are published in the above cited journal, issue No. 8. Pupils are devided into two categories according to age.

fauna conservation, zoological gardens, basic school - 147313.

127. HINTERMEIER, H.:
Amphibienschutz - ein Unterrichtsthema mit Praxisbezug
(The conservation of amphibians - a teaching topic with practical implications)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 10, pp. 345-357.
5 worksheets, 1 transparency model, 1 fig., lit. 21

Amphibians are a very old class of vertebrates - they are approximately 300 million years old. At present, together with reptiles, they represent one of the groups of animals most threatened with extinction. Human intervention is destroying their natural environment. The author suggests the existing situation of amphibians as a teaching topic for biology instruction. First the biology of individual amphibian species is studied, as well as factors which threaten them most, such as land reclamation and drainage, the drying up of marshland and small pools of water and small fish ponds, the proliferation of spruce monoculture forests, the construction of buildings in the landscape, the development of transportation and especially road traffic, which during copulation time tend to destroy large numbers of amphibians. Also pestacides and insecticides act as poisons for these animals, as well as artificial fertilisers. The pollution of water especially by households (detergents) and industrial waste also harm amphibians. When shallow ponds are made deeper for fish breeding, vegetation is destroyed and hence the environment for amphibians. The hunting of amphibians for consumption as food (frog legs) has now declined in many countries, so that France now imports 400 million frog legs for gourmets, while in the FRG imports now attain 442 000 kilograms annually. The author also discusses various possibilities for measures aimed at saving amphibians and their environment by building small tunnels under highways for frog's spring migrations and building small water ponds, which can be made of plastic.

nature conservation, fauna conservation, environmental control, biological activities - 147313.

128. HUNDT, R.:
Entwicklung einer Karte der Luftverschmutzung eines Territoriums - didaktisch-organisatorische und fachübergreifende Aspekte (Making a map which shows air pollution in a given territory - its didactical, organisational and interdisciplinary aspects)
Biologie in der Schule, 31, 1982, No. 1, pp. 11-15.
2 figs.

It is important to structuralise pupils' activities and the author shows how to do this on the basis of the example of an assignment given to pupils concerning the topic cited in the title. The assignment should be carried out in wintertime and requires a complex interdisciplinary approach. Pupils measure dirt as it accumulates on the snow. Approximately 120 sites are chosen and with the aid of a 1 dm^2 large circle of plastic, samples of dirty snow are taken to a depth where the snow is white again. The samples are processed in a laboratory on the basis of methods described in the literature cited by the author. The quantity of fallout is measured in grams per 30 days on 1 square meter. The assignment can also be used for hobby club activities.

environmental control, air pollution, interdisciplinary relations, hobby clubs - 147396.

129. CHRISMAS, M.:

Environmental Factors Influencing the Growth of the Lichen Xanthoria Parietina on Four Selected Roofing Materials

The School Science Review, 63, 1982, No. 224, pp. 472-476. 3 figs.

Among the factors which influence the growth of lichens are light, humidity and the structure and chemistry of the substrate. Xanthoria parietina is one of the most common lichens; the author suggests experiments using four types of roofing materials: roofing tiles made of brick clay, of slate, asbestos and cement. The experiment was carried out on 100 roofs made of these materials, with the aid of a compass, clinometer and a polarograph used to assess the samples. The interesting findings are summed up by the author in a circle diagram and a curve which indicates water loss in various types of roofing material.

environment, air pollution, lichens, indicators + pollution, experiment - 147413.

130. INOZEMTSEV, A.A.:
Okhrana landshaftov (Conservation of the landscape)
Biologiya v shkole, 56, 1982, No. 2, pp. 6-13.
2 figs.

The first national parks and nature reserves were formed in the USSR on the basis of direct instructions from V.I. Lenin. In a biocoenoses, all its components form an integrated whole. Man lives in almost all places on Earth, in various landscapes and biocoenoses and influences them by changing their structure, function and characteristics. The conservation of the landscape has now become a necessity. Some areas are conserved on the basis of international endeavours to maintain typical, natural, undamaged landscapes - in the USSR there are 7 such areas (central black soil, the Berezin area, the Caucases, the Tsary-chelksk region, the Repeteksk region, the Sikhote-Alinsk region and the Priokiskoterrasna region). In these areas the aim is to conserve the ecosystem or bio-geocoenoses. There are approximately 100 such protected areas throughout the world. Besides this the USSR also has national parks, reservations and various protected territories, as well as outstanding anthropogenous landscapes.

landscape conservation, biocoenoses, bio-geocoenoses, reservations, USSR - 147396.

131. INOZEMTSEV, A.A.:
Okhrana prirodi - delo vsenarodnoye (Nature conservation - the task of the whole nation)
Biologiya v shkole, 56,1982, No.3, pp. 16 - 19.

The author acquaints readers with the course, main papers presented and conclusions of a seminar held in October 1981 in Astrakhan. Participants were members of the scientific and methodological council for the promotion of nature conservation, attached to the "Znaniya" society of the Russian Federation. Its members are outstanding scientists in environmental control and related areas whose task it is to assist in implementing environmental control throughout Soviet society. The article contains the names of all the papers presented and their bief content.

nature conservation, environmental control, seminar
USSR - 147313.

132. JEDICKE, E.:
Praktische Jugendansätze zum Schutz der Natur
(Practical suggestions for young people concerning nature conservation)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 12, p. 445.

Education towards nature conservation is an important component of school work. The success of this education has a positive effect when young people become aquainted with nature conservation problems and act accordingly. The Centre for Educational Work with Youth in Hessen has organized courses for young people in which at first 300 and later more than 1000 young people participated. Groups of young people did practical conservation work outdoors which included building small ponds for amphibians, planting hedgerows and greenery on former piles of waste, taking care of protected areas, cutting and planting willow trees, planting and upkeeping meadows and lawns. The main purpose of this type of education is the forming of proper motivation for nature conservation and also gaining practical experiences. Such work must be carefully prepared and this includes, for instance, asking the owners of land for permission to carry out various activities. The courses proved to be very successful and led to a number of positive activities.

nature conservation education, environmental control education, biological activities, courses - 147313.

133. KAHNT, G.:
Biologischer Landbau (Biological landscaping)
Der Biologieunterricht, 18, 1982, No. 2, pp. 6-17. Lit.9
11 surveys

Landscaping can be achieved in various ways - ecologically, biologically, organically or in other alternative manners. The article deals with landscaping understood in an ecological manner. The conversion of nitrogen into plant proteins takes place through nitrogen bacteria on the roots of viciaceae plants. This conversion is more efficient then chemical synthesis from NH_4 or from NO_3 compounds in fertilizers. Cultivation of the soil is better done by plant roots, fauna which lives in the soil and small organisms, then by technical and mechanical means. Weeds, disease and pests should be combated by biological rather than chemical means, because fungicides, biocides, herbacides, pestacides, and insecticides are dangerous even for people. Meadow and forest landscapes serve not only for the production of food, fuel and raw materials but also for the regeneration of air and water and for human recreation. The aim of biological landscaping is the utilization of the natural circulation of matter in nature and thus the qualitative improvement of food, air and water. This improves the environment as a whole, saves energy and improves the natural fertility of the soil. Weeds can be weeded, cultivated or ploughed under, burnt or destroyed by herbacides. The soil can be cultivated mechanically, chemically and biologically. By the cultivation of viciaceae plants energy can be conserved (the production of fertilizers, their transportation). When recycling is used (organic substances, P, K, C_a are returned to the soil in manure, waste from crop production and animal breeding), fewer chemicals are used and crops increase. The author discusses in detail the advantages of organic fertilizers, plant protection and other factors which damage the landscape.

nature conservation, forming of a natural environment, fertilizers, plant disease, insecticides - 1473956.

134. KASHUBE, H.:

Beschlüsse des X. Parteitages - an territorialen Problemen erläutert (The conclusions of the Xth Congress of the Party - explanations on the basis of specific problems)

Biologie in der Schule, 31, 1982. No. 2-3, p. 104.

For teaching topic No. 2.4, in the 9th class, the author chose various specific examples from his vicinity to teach about the Directives of the Party Congress. For instance he acquaints pupils with the crop production of the local United Farm Cooperative, gives pupils independant assignments, such as a study of the law concerning landscape conservation and identifying protected species found in the vicinity of the school.

nature conservation, environmental control, independent assignments + pupils, GDR - 147313.

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135. KUKAN, Š.:
Podněty XVI. zjazdu KSČ pre výchovu k starostlivosti o životné prostredie (Incentives provided by the XVIth Congress of the Communist Party of Czechoslovakia concerning environmental control)
Přírodní vědy ve škole, 33, 1981-1982, No. 10, pp. 362-364.

Already the XVth Congress of the Party dealt with problems of environmental control and the XVIth Congress devoted exceptional attention to this problem. A number of incentives and ideas for educational work in schools and for education outside the school system can be found in the Congress documents. In connection with the increased efficiency of the national economy, the contradictions between the social and economic activity of people and the quality of their environment are increasing. The author develops various suggestions for environmental control education concerning the soil, the forests, the development and conservation of waterways, clean air, clean water, public greenery and nature conservation. He stresses that these problems should be taught in science instruction in the 3rd and 4th classes of basic school and then in biology instruction according to the new curriculum and textbooks.

environmental control, 16th Congress of the Communist party of Czechoslovakia, general education school, educational activities outside the school system, instruction + science, instruction + biology - 147396.

136. KURGANSKA, S.A.:
Belotsvetnik (The snowflake)
Biologiya v shkole, 56, 1982, No. 2, pp. 77-78.

The article deals with the Spring snowflake (Leucojum vernum), the Summer snowflake (Leucojum aestivum) and the Autumn snowflake (Leucojum automnale). At present we know of 9 species of this genus. They grow from the Atlantic coast of western Europe and from northern Africa to the northern Balkans, the Crimea and the Caucases. Two species grow in the USSR, the Spring and Summer snowflake. The author describes their biology and how they can be propagated by seeds or bulbs. After 5 to 10 years bulbs should be replanted at a new site. If the flowers are cultivated from seeds they will bloom after 6 to 7 years.

nature conservation, floral conservation, USSR - 147313.

137. LEBEDEVA, A.A. - SOLDKO, A.S.:
Orchidei ofris (Orchids of the Ophrys genus)
Biologiya v shkole, 56, 1982, No. 3, pp. 78-79.

The authors describe a group of orchids which have a body structure which reminds us of instects. There are 500 genera and 20 000 species of the orchidales (or Orchidaceae) family. In the USSR 45 genera and 120 species of orchids are found: of this number only 5 belong to the genus Ophris. The authors provide a detailed characteristic of the genus and the 4 species which are protected plants in the USSR.

nature conservation, flora conservation, Orchidaceae, USSR - 147313.

138. LEROND, M.:
En Normandie, une recherche sur les bioindicateurs de la pollution de l'air (A research project carried out in Normandy concerning biological indicators of polluted air)
Biologie, Géologie, 69, 1982, No. 2, pp. 419-429.
1 fig., 1 tab.

A member of the staff of the documentation centre of the Museum in Rouan here makes use of his extensive knowledge of Normandy, which is one of the most industrial regions in France, to describe methods of determining air pollution by industrial exhalations. He considers lichens to be the most effective biological indicators available at present. This is because of their long life span, their photosynthetic activity which takes place practically all year, their great accumulation capacity and their dependence upon the atmosphere. Since 1950 biochemical and bio-geographical data has been gathered concerning the influence of air pollution on the development of lichens, which are especially sensitive to acid pollution. The author describes practical methods for examining the quantitative, qualitative and indirect effects of air pollution, depending on the substrate on which the lichens grow. In conclusion the advantages of this method of measurement are described.

environmental control, air pollution, lichens, France - 1473396.

139. MAJKOWSKA, J.:
Koło LOP w obronie naturalnego środowiska (Competitions organized by the League for Nature Conservation on environmental control)
Biologia w szkole, 35, 1982, No. 1, pp. 60-63,
2 photos.

This competition is organized for pupils of basic school. The author reports on various activities organized within the framework of the competition, such as protests organized by pupils of a basic school concerning the fact that a thermal power station is dumping ashes in the close vicinity of their school. This protest was successful and the regional authorities issued a decree prohibiting the dumping of ash at that locality.

The author provides a survey of the organisations' work during recent years. Pupils also participated in planting trees.

nature conservation, environmental control, biological activities, nature reservations - 1473396.

140. Ohrožené organismy krkonošské přírody
(Threatened organisms in the nature of the Krkonoše mountains)
Krkonoše, 15, 1982, No. 1.

Among the threatened plants found in the Krkonoše mountains is the Speedwell (Veronice bellidioides L.) which may become extinct, because people trample on it and garbage from recreational facilities pollutes the soil. The beetle Aphodius piceus GYLL. is threatened because of the destruction of forests, their undergrowth and changes in the population of large mammals in whose manure the beetle develops. The water insect Sericostome personatum SPENCE is threatened by polluted waters in general and especially those polluted by detergents. Among birds, the Commun snipe (Gallinago gallinago) is threatened because of a lack of nesting sites due to water drainage. It is protected the whole year around. Marshlands and wet biotas must be maintained if this bird is to survive,as well as quiet at nesting time and prohibition of hunting this bird at its winter locality.

nature conservation, flora conservation, fauna conservation, Krkonoše mountains - 147313.

141. Ohrožené druhy krkonošské přírody (Threatened species in the nature of the Krkonoše mountains) Krkonoše, 15, 1982

Among the treatened plants are the Bellflower (Campanula bohemica HRUBY), among threatened animals the beetle Pteroloma forstroemi CYLL, the May fly Ameletus inopinatus EATON and among birds the Common sandpiper (Acitis hypoleuca). These organisms and the demands they make upon the environment are described, as well as how they are threatened and what possibilities there are for saving them before extinction.

nature conservation, flora conservation, Krkonoše mountains - 147313.

142. Ohrožené organismy krkonošské přírody (Threatened organisms in the nature of the Krkonoše mountains) Krkonoše, 15, 1982, No. 12, p. 7.
2 figs.

Among the threatened plants are the Hawkweed (Hieracium alpinum). Of the 60^{0} species of this taxon, only 90 taxons still survive in the Krkonoše mountains, of which 23 are endemic to the Krkonoše mountains. Also the beetle Spherites glabratus, the only representative of the family Sphaeritidae in this country, is threatened. Also Dima bicaudata is a threatened specie of insects; among birds it is the Woodcock (Scolopex rusticole)

nature conservation, plant conservation, fauna conservation, Krkonoše - 147313.

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143. OSTROWSKI, H.:

IV krajowa narada młodych działaczy LOP (4th regional meeting of young staff members of the Nature Conservation League)

Biologia w szkole, 35, 1982, No. 2, pp. 119-120.

In September 1981 the 4th general education secondary school in Warsaw played host to a meeting of young people who work in the Nature Conservation League; the meeting was organized under the asupices of the Ministry of Education. 300 delegates from various regions participated. A number of papers were presented concerning nature conservation and environmental control and the outcome of a competition organized by the League were announced. The main motto of the meeting was "Let Us Conserve the Greenery of Poland and Let All Pupils Feel Responsible For It."

nature conservation, Nature Conservation League, Poland - 147313.

144. PAGLIARI, M.:

Considezazioni conclusive (Final considerations)

Scuola e didattica, 26, 1980-1981, No. 18, pp. 63-64.

The author here sums up various topics related to the problem of nature conservation and environmental control in science instruction and adds comments concerning methodological and didactical aspects of these topics, including problems of motivation and content.

nature conservation and environmental control - topics for instruction, motivation - 147396.

145. PATOČKA, K.:

Péče o životní prostředí jako motivace přírodovědného učiva (Environmental control as motivation in science instruction)

Komenský, 106, 1981-1982, No. 10, pp. 582-584.

The new concept of our school system stresses the education of children towards environmental control. The aim of this education is not, however, to acquaint pupils with specific facts in the form of categorical judgements, nor is it merely a fashionable addition to instruction, but rather one of the most important tasks of socialist education; its principles are in full accord with those of worldview education. In this contest the problem of motivation is very important. In the elementary classes of basic school motivation in general science education is achieved by making the pupils aware of the immediate impact of the problem in question and by applying the regional principle. During outdoor excursions the shapes of tree leaves can be studied, the crowns of trees and their fruits; at the same time however, the problem of conserving trees should be mentioned. In a similar fashion when visiting an orchard in the spring or when various animals are observed, etc. In connection with observing birds, the problem of bird boxes should be dealt with, and how children can contribute to bird conservation. In a similar fashion teachers should motivate pupils throughout basic school.

environmental control, education + environmental control, instruction + general science course, basic school, motivation - 147396.

146. PATOČKA, K.:
Příroda ve světě dnešních dětí
(Nature in the world of children today)
Komenský, 106, 1981-1982, No. 2, pp. 92-95.

Contacts between children and nature develop their sensory perception, they learn to observe and their intellect is developed. By learning about nature and natural phenomena, a child becomes convinced of the material essence of the world and learns how man utilises, influences and changes nature. The outcome of such education is a correct attitude towards nature, nature conservation and environmental control. The exaggerated technical development of the world, however, leads to alienation from nature. This makes the life of children less rich, especially from an emotional point of view. In this context the author analyses the teaching syllabus and curriculum for the first classes of basic school. The teacher should implement these syllabi and curricula in such a way that children's emotions and interests in nature are channeled into a concern for nature conservation. Verbal approaches in instruction should be greatly limited, instruction properly motivated and pupils made more active in the course of observation, experiments, problem teaching, in the course of hobby club activities, etc. Also regional elements should be made maximum use of. The author cites a number of various assignments and projects for regional work in botany, zoology, geology and paleontology which are all suitable for the lower classes of basic school. Also use of the school plot of land and visits to zoological gardens and botanical gardens are discussed.
education + nature conservation, instruction + elementary science, instruction + the natural sciences, basic school, lower classes of basic school, motivation, activation + pupil - 147313.

147. PAVLOVA, T.P.:
Juniye evenki na strashe prirodi (Young shepards guard nature)
Biologiya v shkole, 56, 1982, No. 3, pp. 58-59.

The author describes educational activities in a boarding school for the children of shepards in the Amur region. On the basis of the staff's iniciative a school forestry operation was founded in which various groups of pupils work. The author describes the work of these groups and how they contribute to nature conservation in the region.

environmental control, boarding schools, forestry operation, hobby club - 147313.

148. PODSTOLSKA, M.:
Z prac panstwowej rady ochrony przyrody (On the activities of the State Council for Nature Conservation)
Biologia w szkole, 35, 1982, No. 1, pp. 57-58.

In June 1981 a plenary session of the State Council for Nature Conservation was held. A team of its members, led by prof. W. Brzezinski, prepared for the meeting a nature conservation plan for the period until 1985. The founding of 7 new national parks was approved, and some existing parks were extended as far as their area is concerned. It was decided to allow 1000 sheep and 20 cows to be put to pasture in the Tatra Mountain National Park. The Council also gave its approval to decrease the territory of the Tatra Mountain National Park in the northern area, a project to care for bears in the area, a project to make a complete inventory of caves, and a list of protected mushrooms on the territory of Poland, as well as a number of other items.

nature conservation, Tatra Mountain National Park, government administration - 147313.

149. PODUSCHKA, W.:

Zur Biologie des Igels - Bedrohungen, Schutzmassnahmen und Überlebensschanzen (The survival of the hedgehog - its threats, conservation measures and chances for survival)

Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 9, pp. 247-252.

There are three species of hedgehogs on the European continent: the Western hedgehog (Erinaceus europaeus LINNAEUS, 1758), the Eastern hedgehog (Erinaceus roumanicus BARRETT-HAMILTON, 1900) and the Algerian hedgehog (Aethechinus algirus DUVERNOY et LEREBOULLET, 1840). New work has indicated that the Western and Eastern hedgehogs are independent species. In the FRG the Western hedgehog (the only specie living there) is protected by a law dating back to 1936, as well as by a new law from 1976. At present the hedgehog is especially threatened by automobile traffic and also by the rapidly occuring changes in the environment, fluctuations in the weather and by parasites. The hedgehog tends to seek out roads because they provide a warmer environment, where insects can be found. The hedgehog hears vibrations made by a coming car very well, but his natural reaction is to turn inte a ball, which does not provide aby protection from a car. His "armed pacifism" is a method which has enabled him to survive millions of years as a successful natural experiment, but in modern times the method is no longer adequate. Hedgehogs also tend to come close to human settlements where they find sufficient food and a hiding place in shrubs. Hedgehogs prosper in the vicinity of man, because people have formed a suitable ecological niche for it. But recently attempts to do away with shrubs and change gardens only into large lawns has damaged the hedgehod's natural environment . As far as parasites are concerned, the hedgehog is attacked by the threadworm Crenosoma striatium, which has molluscs as intermediate hosts. On the other hand this parasite has been threatening hedgehogs for millions of years and no large-scale attack on the hedgehog by this parasite has so far been reported. At present another problem has arisen. Litters of young hedgehogs appear not only in May and August, but also in September and October. Its seems that the climate make this possible. But young hedgehogs which do not achieve a weight of 600 to 700 grams will die during winter hibernation. Conservation measures include catching small hedgehogs providing hibernation, feeding them and then when they achieve sufficient weight, setting them free.

fauna conservation, insectivores, automobile traffic, biological activities - 147313.

150. PRISYANZHNYUK, B.B.:
Goral (The Goral)
Biologiya v shkole, 56, 1982, No. 1, pp. 74-77.

The author describes the Goral, which is a relative of the Mountain goat and is in the Red Book of the USSR. The surviving numbers of this animal both in the USSR and elsewhere have greatly decreased and it is now threatened with extinction. The author describes its geography, the demands it makes upon the environment, its biology and bionomics, reproduction, etc. In conclusion the author stress the need to conserve this animal and increase its numbers, as well as the possibilities of its future utilization by man.

nature conservation, fauna conservation, USSR - 147313.

151. RATTEY, F.:
Wirksame Umweltschutzerziehung durch den Einsatz selbstgefertigter Farbdiaserien (Effective education towards nature conservation with the aid of a colour slide series made by the teacher)
Biologie in der Schule, 31, 1982, No. 2.3, pp.76-78.

The use of photographs helps pupils to learn to distinguish various species and educates them towards nature conservation and environmental control. Slides also make it possible to utilize the regional principle in instruction, to increase the impact of aesthetical education and also to facilitate the use of problem situations in instruction. The author describes how he uses not only commercially made slides but also those he makes himself.

nature conservation, environmental control, education + nature conservation, slides - 147313.

152. RÄUBER, H.:
Windschutzstreifen im Bezirk Rostock (Planting windbreaker strips in the Rostock region)
Biologie in der Schule, 31, 1982, No. 9, p. 394.

Planting woody species decreases soil erosion and limits transpiration, thus increasing the intensity of photosynthesis and amount of foilage. These are the reasons for planting strips of greenery in the Rostock region. These windbreakers will be planted on the seacost in strips 5 to 7 meters wide and 150-200 kilometers long. Wild elder, European filbert and poplar trees will be planted.

environmental control, woody species, planting - 147313.

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153. RIABININ, S.:
Problematyka zaječ z zakresu ekologii i ochrony środowiska na studiach nauczycielskich (Problems concerning work in ecology and nature conservation in the course of teacher training)
Biologia w szkole, 35, 1982, No. 2, pp. 74-78. Lit. 12, 1 fig.

Environmental control and nature conservation are very important problems and teacher training should reflect this fact. This requires an independent teaching subject and teacher qualification for this subject, because these problems should be taught by a single specialist and not by a team of teachers (who otherwise teach biology, chemistry, physics, geography, etc.). Nature conservation and environmental control have their own philosophy and theory, as well as subject of study and research. Instruction should take place outdoors, it should not be something taught only theoretically. Among the problems it should deal with are phenology, ornithology, bio-ecology, bio-coenoses, etc. The subject of study includes relations and changes occuring in communities, nature reserves and national parks, agrocoenoses and urban environments. Text-books should be published for this teaching subject and departments established, as well as scientific research institutes and field stations (which will also contribute to teacher training). Also various teaching aids for this subject should be designed and produced.

nature conservation, environmental control, institutions of higher learning, training + teacher, teaching subject - 147396.

154. ROST, F.:

Naturwaldzellen (Forest nature reserves)

Praxis der Naturwissenschaften - Biologie, 31, 1982,
No. 8, pp. 233-238.
3 tabs., 3 figs.

Forestry reserves are selected areas which represent natural forest types found in various areas of the FRG. They do not serve as forestry operations but rather as places for scientific study and the observation of the long-term development of a forestry eco-system. In 1981 there were 326 of these reserves with a total area of 8300 hectars. At present forests cover 29 % of the territory of the FRG and extensive forests are found above all in the Harz region, in the Weserbergland, in Spessart and in the Bavarian forest. But even in these areas the forests are no longer the typical Central European forests of previous times, because human intervention has greatly changed the environment. For the past 150 years spruce monocultures have predominated, with all the negative consequences this has had. Spruce and pine are the predominating tree in forests today, whereas previously, decidous tree predominated; oak and beech have retreated before spruce and pine. In the Federal Republic, the ancient forest has been gone for 200 years. Roe are suitable game for all kinds of forests in this area, while deer tend to overpopulate the forest. The forestry reserves are, however, insufficient in size to conserve all threatened forest flora and fauna.

nature conservation, forests + reserve, history + forest - 147313.

155. RÖSCH, R.:

Eutrophierung und Fische stehender Gewässer

(Eutrophic waters and fish in stagnant waters)

Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 11, pp. 336-341.

Lit. 6, 6 figs.

Eutrophic waters caused by a surplus of phosphorous, cause an increase in the output of plant material (water algae and water plants). In some cases this also causes an increase in the bio-mass of fish. But this has its limits. Eutrophic waters greatly change the characteristics of stagnant waters and change the composition of the flora and fauna found in the water. Lake Constance has been eutrophic for the past 50 years. The author shows how this fact has influenced the fish found in this lake. This development is shown on the Salmonidae genus of fish in the lake and their present forms, which are compared to these fish before the lake became eutrophic. The fish are a good indicator of changes which occur in the lake: they react by changes in size, methods of feeding, the distribution of population in the lake, reproduction, changes in the number of fish caught. When a lake becomes eutrophic, the supply of food increases at the bottom of the lake and the fish spend less time near the surface and more time at the bottom of the lake. Also other fish genera (for instance the roach, perch and carp) spend more time at the bottom. They grow more rapidly, have more eggs and milt and mature earlier. Also bastardisation occurs when the spawning time of various species overlaps. On the other hand the increased supply of food can lead to a deterioration in the conditions for the development of the fish. There is too little oxygen at the bottom of the lake; this has caused some species of fish to have disappeared althogether. The mortality of some fish, especially of the carp, increases at the same time. Fishing yields tend to increase with increased eutrophisation of the water. For instance the Whitefish has been cross-bred to such an extent that while WAGLER in 1941 found 4 species of this fish in the lake, only 2 species are found today (and two sub-species). The milt of the whitefish suffer from a lack of oxygen and become black as a consequence of an abundance of ferric sulphide.

environmental control, water pollution, eutrophic waters, specie spectrum + changes - 147396.

156. SCOTT, S.P.:
The Survival of the Natural World
Natural Science in the Schools, 20, 1982, No. 3, pp. 62-66.
6 figs.

The son of capitan Scott, the Polar explorer who died in 1912 during his return from the South Pole, is a dedicated nature conservationist; here in the form of a letter he speaks about the importance of nature conservation. He also mentions the campaigns against Darwin's evolutionary theory, especially in the USA, and rejects the creationist theory of the development of nature. He also discusses in detail the existing situation in nature conservation and the activities of UNESCO in this field and its numerous projects to conserve living and non-living nature. The author himself has participated in projects to save wild duck, geese and swans, as well as whale and the Panda bear. His letter is part of an appeal to biology teachers to work in nature conservation education.

nature conservation, fauna conservation, USA - 147313.

157. SEDLÁČEK, K. - TRPÁK, P.:

Stanovení výše škody způsobené na ohrožených a chráněných drusích živočichů (Determining the size of the damage caused to protected and threatened species of animals)

Památky a příroda, 7, 1982, No. 10, pp. 635-639.
Lit. 8.

Threatened and protected specie of animals can serve as bioindicators which serve to signalize a serious upsetting of equilibrium in nature and individual eco-systems. They are thus protected for various reasons: aesthetical, scientific, cultural, recreational, economic and for their esoteric value. Damage to the environment of these animals can cause irreplacable losses. The intervention of irresponsible individuals and intentional negligence on the part of organisations can lead to the threatening and finally extinction of various species. Compensating the damage done to protected animals was legislated in Slovakia in April 25th 1974 for the Slovak Socialist Republic. In the Czech part of the country such a law, with a list of fines, has not yet been legislated. The authors have here produced a draft of a first Czech list of fines for damage to threatened specie of animals which are on the Red list of the Czech Socialist Republic. The list includes a basic sum plus possibilities for increasing the compensation for this damage by 5 % to 100 %, according to the size and importance of the damage. Thus for instance a viper snake at 500.- Cz. Crowns, a Fresh-water mussel at 1500.- Cz. Crowns, the Cormorant at 30 000 Cz. Crowns, the Lesser spotted eagle at 50 000 Cz. Crowns. For destroying the developmental stage of an invertebrate or lower vertebrate the basic fine is increased by 100 %, when the eggs of a protected bird are destroyed by 200 %, the young of a protected specie of animal dependent on the care of its parents by 200 %, damaging an occupied living space (a nest or lair) by up to 500 %, besides paying a fine for the animals living in it; those who do not turn in the cadeavar of an animal have their fine increased by 50 %.

nature conservation, conservation of fauna, draft + law, payment of damages - 147313.

158. SEDLAG, U.:
Auch wirbellose Tiere sind von Aussterben bedroht !
(Also invertebrates are threatened with extinction !)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 331-337.
3 figs.

It is not precisely known how many animal species have so far lived on Earth - the well-known American paleontologist Simpson considers 50 to 5000 million as possible numbers and 500 million as most likely. The negative influence of man upon animals has been lasting for approximately 12 000 years. Information concerning the extinction of various species usually concerns only large and popular animals (tigers, elephants) and much less attention is paid to invertebrates. Even less specific data is available as far as the extinction of insects is concerned. The cause here is the extensive use of chemicals in the environment and the extinction of various plants on which insects feed. In conclusion the author provides several suggestions for pupil assignments.

nature conservation, conservation of fauna, invertebrates - 147313.

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159. SEIDEL, E.:

Umweltschutz als Beitrag zur langfristigen Sicherung des gesellschaftlichen Reproduktionsprozesses

(Nature conservation as a long-term contribution to improving the social reproduction process)

Biologie in der Schule, 31, 1982, No. 2-3, pp. 114-125.
7 tabs.

Nature conservation measures can contribute to the effectiveness of the process of social reproduction by improving the utilization of natural resources and the exploitation of unreproducible resources, as well as by improving work and living conditions. This was the manner in which the Xth Congress of the Socialist Unity Party of Germany formulated these tasks. Problems concerning the environment exist at various levels from the global to the national, down to the cellular level (the author enumerates a total of 10 different levels, divided into three different groups). On this basis the author explains the main trends of development in environmental control in the German Democratic Republic until the year 1985.

nature conservation, reproduction, socialist society, GDR - 147313.

159. SKINNER, G.J.:

Marine Pollution

The School Science Review, 63, 1982, No. 3, pp. 453-458.

The author expresses the opinion that the large amount of literature available concerning the pollution of the seas is too technical and hence not suitable for teaching needs. For this reason he offers various information about this problem. He first explains various types of pollution, for instance by pestacides, heavy metals, petroleum spills and waste as well as by other sources (tanker pollution, accidents at sea, pollution by oil refineries, etc.). He deals which each type of pollution separately, according to the damage done to flora and fauna. Other source of pollution which has been increasing recently are submarines, radiactive waste from nuclear power plants and radioactive fallout. The latter is especially damaging to aglae. This is a highly informative article for biology teachers.

water pollution, the seas, radioactivity - 147396.

160. SOLODKO, A.S.:
Kavkaskiy biosferniy zapovednik (The Caucasian biospherical protected reserve)
Biologiya v shkole, 56, 1982, No. 6, pp. 18-24.
7 photos.

The scientific and technological revolution is causing pressures throughout the world in connection with the environment and nature conservation. A special international organization has been founded under the auspices of UNESCO called Man and the Biosphere (MAB), a long-term international program which is bringing together scientists from many countries for seeking solutions to 14 scientific projects, with hundreds of subtopics. Project No. 8 is devoted to the conservation of natural areas and the gene pools found in them. A new form of environmental control and nature conservation has been developed called a biospherical reserve. Its purpose is to conserve existing nature for present and future generation of mankind, the conservation of tropical ecosystems and the gene pool of plants and animals. The main purpose of scientific endeavours in this area is to learn about the biosphere, the degree to which it is threatened, the direction of various changes which are occuring and also to provide information about acute situations. In the USSR there are several biosphere reserve in various regions of the country. Each represents a specific biogeographical region. Throughout the world there are a total of 193 such regions in different countries and seven of them are in the USSR. In these reserves long-term observations are done, especially of an ecological nature. Among them are the Priokeko-Terrasy, the Berezin area, the central black soil region, the Caucasian region, in Central Asia the Sary-Chelekska and Bepetska regions and in the Far East the Sikhot-Alinska region. The article deals in greater detail with the Caucasian Biospherical Reserve in the Caucases of the USSR. The central area of the Caucasian area measures 247 000 hectars of land and covers all the climatic zones of the region.

nature conservation, environmental control, reservation + biosphere, USSR - 147313.

161. SOLODKO, A.S.:
Shafran (Crocus)
Biologiya v shkole, 56, 1982, No. 4, p. 75.
1 fig.

In the autumn the Caucasian National Park blossoms with crocuses. 4 species of the genus Crocus grow here: Crocus scharojanus RUPR., Crocus speciosus BIEB., Crocus valicola HERB. and Crocus variegatus HOPPE et HORNSCH. The author also describes other species of this flower which grow in the Criamean penisula, in Central Asia, the Pyrenees, the Apennines and the Balkan mountains, as well as in Hungary and Jugoslavia; the specie Crocus satvius LINNAEUS, is cultivated as the spice saffron in western Asia. All species of Crocus belong to the family Iridaceae.

nature conservation, conservation of flora, Iridaceae, USSR - 147313.

162. SOMMER, U.:

Die Periodizität des Phytoplanktons im Bodensee - ein Beispiel für Sukzession (The periodical nature of phytoplankton in Lake Constance as an example of plant succession)

Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 11, pp. 323-329.

Lit. 8, 7 figs.

The annual development of the specie composition of phytoplankton in Lake Constance can be divided in two parts, which are closely connected by the hydrographic regimen in the lake. The first includes the summer period of stagnation and is determined by a number of factors, foremost among which are physical factors and then chemical and biological factors. The situation at the end of the summer stagnation period determines the succession of plants based primarily on physical factors. The article specifically describes the situation in Lake Constance in the period between 1979 and 1981.

nature conservation, observations, phytoplankton - - 147396.

163. STABEL, H.H.:

Die Rolle des Phosphors im Stoffkreislauf des Bodensees

(The role of phosphorus in the circulation of matter in Lake Constance)

Praxis der Naturwissenschaften - Biologie, 31, No. 11, pp. 330-336.

Lit. 11, 2 tabs., 3 figs., 1 model for transparency.

Phosphorus and its compounds are a limiting substance for the development of phytoplankton in all types of water, including Lake Constance. This element is present in the global circulation of matter and leads to biological transformations which are of a cyclical nature and which influence existing dynamic equilibrium; the possibilities for utilizing phosphorus by the algae population in the lake changes. However, in recent decades too much phosphorus is finding its way into the lake in the form of waste water from industry and households and this causes the water to become eutrophic, i.e. too rapid an increase in algea production occurs and this has a number of negative consequences (so-called eutrophic phenomena). The flora and fauna in the lake are damaged, the output of algae and macrophytes increases and large quantities of these plants are found at the bottom of the lake where there is insufficient light and where the plants decay. This process of decay leads to an oxygen deficit in the lake and plant material is mineralized on the bottom of the lake. A shortage of oxygen causes far-reaching changes in the lake's biomass. These civilizational changes have made it increasingly difficult to use the lake as a source of drinking water. In the years 1960 to 1980 over 3 billion West German marks have been invested into water treatment in the Lake Constance. Large scale intervention aims at decreasing the amount of phosphorus coming into the lake, but so far all endeavours have been unsuccessful. Even if the present amount of phosphorus were to decline by half, there would still be enough to do damage.

environmental control, water pollution, phosphorus, eutrophic waters, algae - 147396.

164. SUDAKOVA, Z.V.:
Prostrek (The Pasqueflower)
Biologiya v shkole, 56, 1982, No. 4, pp. 77-79.
1 photo.

The Pasqueflower (Pulsatilla ADANS.) belongs to the Ranunculaceae family which includes around 200 species, the majority herbs. In the USSR over 500 species of this family grow and of this number 30 species are Pasqueflowers . The largest number grows in Siberia and the Far East. The Altay region is the focus from which these flowers have spread elsewhere. The author describes briefly these plants which have a wide application in medicine. They deserve to be better protected.

nature conservation, conservation of flora, Ranunculaceae - - ZSR - 147313.

165. SÝKORA, J.:
Péče o životní prostředí - naléhavý celospolečenský úkol (Environmental control-a pressing task for society as a whole)
Komenský, 106, 1981-1982, No. 10, pp. 579-581.

Environmental control is one of the most pressing problems of the technically and industrially developed countries. The rapid growth of industrial output, as well as agriculture have had a negative influence on nature. For these reasons a socialist society must

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deal with problems of nature conservation and environmental control in a comprehensive manner and in schools well in advance. The government of the Czech Socialist Republic on March 3, 1982 enacted the draft of an environmental conservation program for the period 1982-1985 and at this occasion issued a proclamation addressed to all citizens of the country. Care of the environment is now becoming an indivisible part of the economic and social development of the country in which not only central bodies, but also national committes, as well as bodies of the National Front and the organizations which are its members, including the Czech Association for Nature Conservation, will participate. The proclamation concerns conservation of waters, the air, the soil, the planting and conservation of greenery, the collection of seeds, the collection and cultivation of medicinal plants, doing away with spontaneously developed garbage dumps, economizing water, etc. The teachers and pupils in the district of Žďár n.Sázavou also attached their signatures to the government's proclamation and immediately carried out various activities in this area.

environmental control, education + environmental control, general education schools, biological activities - 147396.

166. TAMISIER, A.:
Westlands and Waterfowl
Natural Science in Schools, 20, 1982, No. 3, pp. 66-68.
1 fig.

The author discusses the distressing situation of water fowl and its hunting in some regions. The author is especially concerned with wild duck, wild geese, coots, snipes and other waterfowl, which are often needlessly and thoughtlessly hunted and threatened with extinction. The author has drawn up a table which shows for instance that annually 2.2 million wild ducks are shot in France. The majority of the hunted water fowl are migratory birds and they are massacred when passing through several countries. Czechoslovakia is among those countries which legally protects migratory birds, as is clear from the attached table. The author asks that throughout Europe laws concerning hunting be standardized and cites a number of important reasons for doing so.

nature conservation, protection of fauna, birds, gamekeeping and hunting - 147313.

167. TRECHKOV, V.G. - KAMPOV-POLEVOY, A.B.:
O vrednom vozdeystvii alkogolya na organizm cheloveka
(On the harmful effects of alcohol drinking on the human organism)
Biologiya v shkole, 56, 1982, No. 4, pp. 21-24.

The social roots of alcoholism have been done away with under socialism, but there still exist social influences (microsocial conditions, the behaviour of youth groups), psychological influences (poor adaptation to various situations in life), as well as biological influences (the specific metabolism of certain individuals), which lead to alcoholism. Alcohol has a toxic effect on the whole organism, in the blood it causes the accumulation of the toxic products of alcohol transformation. Alcohol strongly influences the nervous system. It damages the membranes on the lips, in the oral cavity, the pharynx, oesophagus and stomach, causes their hypertrophy, causes gastritis, increases the acidity of gastric juices and causes pathological loss of appetite (anorexia); it also leads to a shortage of proteins and vitamins in the body. Alcohol consumption can lead to alcoholic hepatitis, inflammation of the liver which in 25 - 35 % of cases develops into cirrhosis of the liver; various oedema (liver encephalitis), alcoholic hypertonia, alcoholic cardiac disease and a number of other disease develop. Alcohol is especially damaging to the young, developing organism; the children of alcoholics also suffer greatly.

education + pupil, alcoholism - 147313.

168. TREITZ, P.:
"Lanius" - der Würger, Ornithologische Mitteilungen aus dem Saarland (The Lanius skrike - An ornithological communication from the Saarland)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 10, p. 451, 1 transparency.

Field ornithology studies the life of avifauna and the changes which are occuring due to changes in the environment. Birds are very sensitive indicators of the quality of the environment and react to every change. An Ornithological Club in the Saarland has now published for its members the 20th issue of their Bulletin containing the latest information concerning observations carried out between 1977 and 1979. One concerns the Lanius senator skrike. The issue also describes the activities of the Association, which intends to continue in a registration of all birds found in the Saarland, to cooperate in the drawing up of an atlas of all birds which nest on the territory of the FRG and to organize ornithological excursions, as well as continue in the publication of literature on this subject. Among interesting information published in the Bulletin is data on the decline in the number of Cukoos, reports on finding large numbers of dead Barn owls on the whole territory of the Saarland as a consequence of the sudden cold weather on New Years Eve 1979, the fact that for the first time Tengmalm´s owl (Aegoli funereus) has been found in the Saarland and that the White-spotted bluethroat (Luscinia svecica) has been banded and registered.

nature conservation, protection of fauna, ornithology, observations, FRG - 147313.

169. TREITZ, P.:
Ökologisch bedeutsame Grundflächen (Ecologically important basic areas)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 7, pp. 361-362.
1 photo.

A new organization for the conservation of the natural landscape in the Saarland has been founded, called Naturlandstiftung Saar; this is another step in the direction of developing environmental control in this part of the FRG. The organization will strive to take care of ecologically important basic areas and will cooperate with the Department of Bio-geography at the University of the Saarland. So far the Association has 6 such territories or areas with an area of

25 hectare, and it is now negotiation another two areas. The author describes these areas, which are owned by the Association, their importance, the flora and fauna found on them, etc. This represents a new and very interesting approach to nature conservation and environmental control.

environmental control, Saarland, FRG - 147396.

170. TREITZ, P.:
Vögeltragödien bei Renovierungsarbeiten. DBV: Restaurierungen von Mai bis Juli möglichst vermeiden !
(Bird tragedies in the course of renovation work. The German Association for Bird Conservation: Restoration work should not be untertaken between May and July)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 11, p. 350.

The author stresses the grave danger to nests and bird eggs or nests with young birds which arises during the course of restoration or renovation work on old castles and palaces, when this work is done at the time when birds nest. During renovation work at the ruins of the castle Helfenberg in the FRG the members of the Association were successful in saving the nests of 23 swifts. Now the Association has come with the demand that this type of work not be undertaken during nesting time, from May to July. The Association has 100 000 members in the FRG.

nature conservation, protection of fauna, birds, FRG - - 147313.

171. TRESS, K.:
Die biologische dynamische Wirtschaftsweise aus der Sicht des Praktikers (Biological and dynamic methods of agriculture from the point of view of a practical farmer)
Der Biologieunterricht, 18, 1982. No. 2, pp. 18-19.

The author discusses the disadvantages of the use of chemicals and very sophisticated machinery in agriculture. On the basis of specific facts he demonstrates that even today the best way to cultivate the land is by a closed cycle which was typical for the smaller family farm. Such a farm maintains its fields in very good shape by constantly supplementing its humus, produced by the careful collection of all organic waste, especially all kinds of feces and green mass, into the soil for the revival and activation of the edaphic layer of the soil and by cultivating 25 to 30 % of the land with vetches and other legumes (which enrich the soil with nitrogen due to the presence of bacteria found on the roots of these plants); all this leads to a state of equilibrium in the soil. The author compares the positive and negative aspects of agriculture on family farms with a closed cycle with the impact of large commercial farms which do not alternate crops and only rely on artificial fertilizers and the extensive use of chemicals in the form of insecticides and herbacides and which also use heavy mechinery for cultivating the soil. Only a closed operational complex is capable of producing a sufficient amount of healthy food which is not a health hazard.

environment, agriculture, use of chemicals, mechanisation, compost, natural fertilizer, machinery + agriculture, food - 147396.

172. TROSTYANOVA, R.G. - SOLODKO, A.S.:
Ciklamen (Cyclamen)
Biologiya v shkole, 56, 1982, No. 2, pp. 76-77.

The Cyclamen is in the Red Book of the USSR. In the winter it blooms in the mountain forests of the Criamean and the Transcaucasian region. The genus belongs to the Primulaceae family and has over 55 species. The genus has survived several changes of climate on Earth, but some species have already become extinct. Cyclamen, specifically Cyclamen adsharicum and Cyclamen cerassium, comes from the Criamean peninsula. Elsewhere in the USSR Cyclamen elegans and Cyclamen vernum grow. The author describes individual species of this plant. The well-known potted plant Cyclamen persicum can be found growing wild in the mountains of southwest Asia and southern China. Cyclamen is also a plant with medicinal properties, which is used against rheumatism and disease resulting from the common cold. In the USSR cyclamen plants are protected by law. The author in conclusion also discusses the cultivation of potted cyclamen indoors and the demands they make upon the soil, moisture and the environment.

flora conservation, Primulaceae, USSR - 147313.

173. TUNIEV, B.S.:
Eskupalov poloz (The Aesculapian snake)
Biologiya v shkole, 56, 1982, No. 3, pp. 79-80.

The Aesculapian snake is in the Red Book of the USSR. Its name is derived from the ancient Roman god of medicine. It is among the largest European reptiles and achieves a length of 1.5 meters. It feeds on rodents and birds. It sheds its skin two or three times a year; moulting takes place during the course of several hours during which the snake hides away, does not accept food and has diminished eyesight. From the end of October it seeks out a deep lair where it hibernates.

nature conservation, protection of fauna, Red Book, USSR - 147313.

174. ULYSSE, J.:

De la sauvegarde du chamois dans la réserve de Bure--Autouse (Concerning the conservation of the Mountain goat in the Bure-Autouse reserve)
Biologie. Géologie, 69, 1982, No. 1, pp. 5-10.

The Bure-Autose reserve is in the Alps, covers an area of 8 thousand hectare and originally was formed for the use of hunting associations from nearby districts. Because gradually the situation, especially as far as the Mountain goat is concerned, became very critical, it was decided to take measures to protect this very rare animal, as well as some other animals, for instance the Blackcock and also to newly introduce to the mountains the Mouflon. At present there are approximately 80 to 100 Mountain goats in the reserve and about 500 Mouflons. The author explains why the number of Mountain goats has decreased so much in recent years: the development of tourism and the extensive use of automobiles are among the most important reasons; the need of the animals for peace and quite are stressed. Also the planning of the number of animals living in the mountains and the shooting of older animals, while at the same time ceasing all hunting as soon as the optimum number is achieved, are stressed. If the rules are not kept, the situation where no Mountain goats live in the French Alps might very well occur.

nature conservation, protection of animals, mammals, France - 147313.

175. URBAN, F.:

Nejnovější obyvatel Šumavy (The newest inhabitant of the Šumava mountains)

ABC mladých techniků a přírodovědců, 26, 1982, No. 19, pp. 16-17.

On January 21, 1982 a pair of Northern lynx were set free in the Šumava mountains; the animals came from the Beskyd mountains of Slovakia and they were transfered to the Šumava mountains after a through ecological study of the area. The last Northern lynx was shot in the Šumava mountain 150 years ago. A lynx requires a territory between 200 and 400 hectars large. The Zoological Garden in Ostrava has provided lynxes to zoos in Switzerland, Jugoslavia, Austria and the FRG. In the FRG they have been set free in the Bavarian National Park and from there they have spread to our territory, where they have been observed already in 1970. The Czechoslovak Society for Science and Technology of the Forestry Operations Enterprise then decided to settle 6 to 12 pairs of lynxes from Slovakia in the area. The lynxes which come to Czechoslovakia from Bavaria (FRG) are of the same origin, they also come from Slovakia.

nature conservation, protection of animals, predators - 147313.

176. WESSEL, V.:

Biologische Landwirtschaft und ihre Bezüge zu einem projektierten Unterricht - Einführung und die Thematik (A biological landscape and its relation to project teaching)

Der Biologieunterricht, 18, 1982, No. 2, pp. 23-37. 4 photos, lit. 14

Alternative forms of the landscape mostly include conventional agriculture based on the use of artificial fertilizers and poisons, as well as monoculture and the extended use of heavy machinery. The purpose of creating such a landscape is to produce as much as possible. In a biological landscape, stress is placed on closed operational circulation based on the following: the soil - - crops - animals - man and their mutual relations. The present system of agriculture is based on cereal production, without alternating crops, as well as the large-scale breeding of livestock for the production of meat, eggs and dairy products. Now farmers as such hardly exist any more. A biological structure of the landscape requires long-term planning, a decline in the use of artificial fertilizers, chemicals and antibiotics. The author compares agriculture which uses large quantities of chemicals with natural production in a biologically dynamic landscape. He comes to the conclusion that biological methods used by agriculture, including orchards, gardening and vine growing, yield either the same or only slightly (by 10 to 20 %) lower crops, but this deficit could be compensated for by greater durability, better taste (of fruits and vegetables) and thus higher sales prices. The large-scale breeding of animals has a number of advantages but also disadvantages; the animals are less resistant to disease, less fertile and live for shorter periods. The demand for products produced in biological landscapes is constantly increasing. There have been several scandels when the public has found out that for instance meat contains dangerous hormones, such as estrogens. The sensitivity of the population towards overburdening the landscape, as well as towards eutrophic waters is constantly increasing. The author indicates how schools can be included into strivings for a biological landscape and biological agriculture, as well as to combat the dangers posed by existing agriculture.

modernization + agriculture, use of chemicals, mechanization, animal breeding, crop production, methods + biology - 147396.

177. ZAROVNIY, G.M.:
Iz opyta organizatsii shkolnikh zakaznikov
(Concerning experiences with the organization of school nature reserves)
Biologiya v shkole, 56, 1982, No. 1, pp. 60-62.

The author here discusses one form of nature conservation - school nature reserves. He describes where such nature reserves can be founded and cites a number of examples of such reserves. He also stresses the need to find a suitable place where original natural communities typical for the area in question exist. He also cites examples of how pupils can contribute to nature conservation on these reserves, but also how they can be economically utilized, without damaging the natural environment they are found in.

nature conservation, school + nature reserves - 147313.

178. ZAWADSKA, W.:
Jak przebiega edukacja środowiska młedziezy w województwie Gdańskim (How education towards environmental control is done among youth in the Gdańsk region)
Biologia w szkole, 35, 1982, No. 2, pp. 120-123.

Ecological education aimed at environmental control is a part of an education in biology. In the Gdańsk region there is a special Institute belonging to the League for Nature Conservation which organizes various nature conservation activities within the framework of school, as well as outside the school system. Since 1973-1974 schools have organized biological competitions which concentrate on marine biology and marine ecology. In 1980-1981 all school-leaving examination work in biology was included into the competition. The author describes also other competitions and other activities organized for students of general education secondary schools concerning nature conservation and environmental control. The League also runs an Ecology School, where series of 10 lectures concerning nature conservation are given.

education + environmental control, instruction + biology, League for Nature Conservation, secondary schools, competitions - 147396.

6.88 Health-care education in biology instruction

179. BAER, H.W.:
Alkohol - Die Altagsdroge (Alcohol - the everyday drug)
Praxis der Naturwissenschaften - Biologie, 31, 1982,
No. 12, pp. 359-363.
2 worksheets, lit. 25.

At present the most frequent drug abuse is alcoholism. The author describes the effects of alcohol on the human organism and has prepared for this topic in biology instruction various transparencies. The article cites most recent findings concerning drinking and behavioural patterns among the citizens of the FRG. The consumption of alcoholic beverages is constantly increasing and a number of alcoholics have been found to "graduate" to harder drugs. Alcoholism is now defined as drinking above the upper limit of sensibility towards

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alcoholic beverages (usually 60 g of alcohol in men and 20 g in women). The exact causes of this limit are not precisely known. According to one theory, drinking is a need which may lead to alcohol abuse, according to another, alcoholism is a disease. The latter theory is probably closer to the truth, as experiments with animals have indicated, as well as the fact that an appetite for alcohol is genetically founded. As a disease it requires treatment and of course the participation of the patient. Alcohol gets into the blood stream by diffusion in the digestive tract and the membrane in the oral cavity. Normally, 20 % of alcohol intake is diffused through the membrane of the stomach and 80 % through the intensines. 30 to 60 minutes after the intake of alcohol its maximum level in the blood is achieved. It diffuses in a relatively rapid manner into the tissues (after 10 to 30 minutes). The distribution of alcohol depends on the water content of the beverage and the degree of vascularization. Alcohol content is highest in the cerebral cortex. It is degraded in the liver by NAD^+; in men in 1 hour 0.1 grams of ethanol are degraded per kilogram of body weight, in women this figure equals 0.085 grams. Alcohol also has an indirect effect as a food - 1 gram of ethanol provides the body with 2.97 kJ, after larger intakes of alcohol a person is hungry for fats and suffers from a shortage of vitamin B. Alcohol also has an effect similar to that of spices, i.e. it creates an appetite and contributes to the forming of gastric juices, it overcomes fears and embarassments, increases blood pressure and circulation in older people. In larger quantities it has the same properties as drugs, influences the functioning of the brain and the behaviour of a person. In larger quantities it also has a markedly toxic effect. The author deals separately with the influence of alcohol on the nervous system, on digestion, on the kidneys, on a human embryo and discusses its interaction with other drugs and chemicals. In conclusion the author stresses that the excessive drinking of alcoholic beverages is always detrimental to health; it can be drunk in small quantities, but never regularly. It arouses an appetite, which is important for older people, decreases mental stress, when small quantities of beer are drunk cardiac infarctus is less frequent, drinking alcoholic beverages requires the frequent emptying of the bladder and thus contributes to preventing the formation of disease. But the consumption of alcohol is growing too rapidly, and the consumption of beverages with a high quantity of alcohol is replacing the drinking of beverages with a low alcohol content. Also non-alcoholic beverages are often more expensive in restaurants and bars that alcoholic beverages.

health-care education, alcoholism - 147313.

180. BOLAY, E.:
Eine "freie Unterrichtseinheit" zum Thema Ernährung - Ein Erfahrungsbericht (A "free thematic unit" on the topic Nutrition - report on experiences gained)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 2, pp. 46-52.
1 test.

The author provides information on the inclusion of a free thematic unit concerning problems of nutrition in the biology course taught in the 10th class. The plan of the lesson should be drawn up by the pupils themselves and should be composed of papers presented to the class by the pupils themselves. In this free type of instruction the teacher plays the role of a coordinator and organizer, who helps pupils when they require help. This method of instruction makes great demands upon both pupils and teachers. Every pupil is included and the author has found that even those who are typically quiet and timid tend to participate and enjoy preparing papers. The author provides a list of suitable topics which can be offered to pupils and with which he himself has gained positive experiences: the processing of cereals; from grain to slices of bread; the history of cereals and bread; cereals as the basic food of other nations; fermentation and the leavening of bread; the baking of bread and other bakery products, etc. Since the teaching syllabus is so full, normal lesson tends to be hasty. Here less is taught, but with much greater effectiveness.

instruction + human biology, nutrition, class paper + pupil - 147313.

181. CALABRESE, E.:
Occupational Health: Its Relevance to High School Students
The American Biology Teacher, 44, 1982, No. 2, p. 111.

On the basis of publications produced by various healthcare institutions the author provides information on the health hazards of work in various branches of industry. Besides other disease, 60 to 90 % of cancer is caused by various industrial factors or otherwise connected with industry. High school students who during the summer work in industry to make money should be informed about the health hazards posed by various industries and the possibilities of protecting themselves against the effects of various carcinogenic substances. Also students who will be making a vocational choice after high school graduation and are considering work as chemists, biologists, foremen, airplane pilots, etc. should undergo standard courses concerning preventive measure to protect workers against occupational hazards.

health-care education, carcinogenic substances, industry - 147313.

182. CLARKS, C.:

The Uncertainty Principle as Applied to Medicine

Journal of Biological Education, 16, 1982, No. 2, pp. 93-96.

5 tabs.

The author is a physician and researcher who here discusses some of the incorrect opinions which prevail among the public concerning the causes of some disease. Specifically he discusses the influence of smoking on lung cancer, the influence of alcohol on liver disease, congenital abnormalities, Saint Vitus's dance (chorea) and others. A specific lack of certainty lies in the fact that we cannot, in the final analysis, say that every strong smoker will necessarily become ill; the same holds true for drinking. The immediate cause of a disease may be different or the disposition of the person to the disease may decide when and if the disease will break out. This is documented by various statistical material which is the outcome of several years of work.

health-care education, development + disease, chromosomal abberations, cancer - 147313.

183. CRAFT, M. et al.:

Health Education in Schools: Response of Biology Teaching to a Dental Health Curriculum Module

Journal of Biological Education, 15, 1981, No. 4, pp. 285-288.

The article comments the existing situation in health-care education in secondary schools in England and Wales, with special stress on education towards dental care. After parents and physicians, biology teachers are in the best position to provide information concerning dental care, not only in the narrow sense, but also including such problems as the composition and structure of food, nervous stress, making children hardy, etc. which all have a role to play in dental hygiene. The discussion provides information on the opinions of teachers, parents and specialists in the field. The author bases his conclusions on a questionnaire to which 4500 students in 37 schools responded.

health-care education, secondary school, England, dentition - 147313.

184. EDWARDS, N.J. - COHEN, E.J.:

Health Science Career Education for Minority Junior High School Students

The American Biology Teacher, 44, 1982, No. 3, pp. 168-171.

The authors deal with a health science career education for minority students from junior high school who after graduation can best serve their own people. They stress the difficult situation existing in this area and indicate a curriculum for special schools, where members of the staff of hospitals and universities could teach. The medical personnel graduating from these schools would be "practicians" and not registered health-care personnel and would learn various work connected with making bandages, sterilization procedures, taking X-rays, care of mentally ill children and other auxilliary work. Minority sections of the population usually are in low-income groups and thus are unable to send their children to regular medical or nursing schools which also require very high academic standards and are thus often out of reach of minority students.

health science career education, health science schools, health-care personnel, racism - 147313.

185. EISENBLÄTTER, D.:
Neuere Daten über Entwicklung der Rauchgewohnheiten Jugendlicher (New data on the development of smoking habits among minors).
Biologie in der Schule, 31, 1982, No. 9, pp. 389-390.
1 tab.

For planning campaigns against smoking it is important to have the most recent data concerning how widespread smoking is and its trend of development. In this context the outcome of a study of young people born in 1964 is very interesting. It was found that in 1977 this group of 12-13 year-olds had 5 % smokers. In subsequent years their numbers increased, especially in the 14 to 15 year-old period. A table provides details.

health-care education, smoking + youth, research - - 147313.

186. FINCH, I.:

Introducing Nutrition

Natural Science in the Schools, 20, 1982, No. 3, p. 75-78.

1 fig.

The author discusses four basic kinds of food: meat, fish, eggs, milk and chees; fruits and vegetables; potatoes and other supplements and finally beverages. When discussing the first group methods of preservation are discussed, as well as methods of cooking and spicing and the coloring agents and additives used. Dehydrated or frozen food usually loses its vitamin value, as well as other nutritional values. Additives, such as sauces, salt, etc. also belong to food. The author stresses the low nutritional value of fats, oils and sugar especially for children. In conclusion the author suggests school assignments for pupils concerning nutrition.

health-care education, practical excercises, calory consumption - 147313.

187. FLANNERY, M.C.:

The Curious Chlamydiae

The American Biology Teacher, 44, 1982, No. 2, pp. 116-117.

1 fig.

The author describes in detail the Chlamydia trachomatis bacterium which co-produces a number of disease, especially veneral disease; they have not yet been sufficiently studied, in spite of the fact that their incidence especially in the industrially developed countries has been proven by health-care organizations. Also when treating infertile women it has been found that this bacterium is present, as well as in spontaneous abortions. Physicians were surprised by the finding that in 30 to 50 % of all pneumonia cases the presence of these bacteria was documented. The Chlamydia trachomatis bacterium is easily discernible and the author recommends that students undertake experiments with this interesting bacterium.

health-care education, bacteria, experiments - 147313.

188. GOTZLER, H.:
Drogen - Historische Bedeutung und neurobiologische Wirkungsweisen (Drugs - their historical significance and the neurobiological methods of their effect)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 12, pp. 353-358.
1 pattern for transparency.

Drugs are claiming an increasing number of victims and their use is spreading to medium and small towns and to younger age groups. For these reasons the problems connected with taking drugs should be dealt with in school instruction and their damaging effect on the human organism and the effects of individual neurotropic drugs should be explained. According to recent studies carried out in the FRG, 3 % of those addicted to drugs are under 16 years of age and 37 % are between 16 and 20 years of age. The author suggests that this subject-matter be taught in the upper classes of secondary school in courses on psychology, civics and biology (within the framework of neurobiology). At the same time the danger of providing too much information about drugs should also be taken into account, since this might lead to arousing pupils' curiosity and their longing to try them out. The scope of information to be provided should be carefully considered. The author describes individual drugs, their effect and dangers.

She mentions opium, morphium, codeine and alcohol. She stresses the side-effects of drug use and their criminal implications. She also discusses neurotropic drugs such as tranquillisers, hypnotic agents and sedatives (barbiturates, librium, valium). Also halucinogenic drugs which alter the consciousness and personality of a person, such as mescalin, hashish, marihuana and LSD are briefly described.

health-care education, drug addiction - 147313.

189. HORN, U.:

Arzneimittelmissbrauch und seine Folgen (The misuse of drugs and its consequences)

Biologie in der Schule, 31, 1982, No. 9, pp. 386-388.

The development of the pharmaceutical industry has been leading to the discovery of better and more potent drugs. But very often new drugs have varied side--effects. The misuse of drugs can be defined as the chronic, addictive taking of drugs without sufficient reason. The author distinguishes addiction in the mental sense and addiction when the patient becomes physically dependent upon a drug. The two groups of drugs which are most often misused are analgetics (pain klling drugs) and those that put the patient to sleep or calm him down. These two groups are dealt with in detail.

health-care education, toxicomania, drugs + misuse - - 147313.

190. JASZCZUR, U.:

Problemy alkoholizmu (Problems of alcoholism)

Biologia w szkole, 35, 1982, No. 1, pp. 47-57.

Anti-alcoholic education is an important component of education in biology instruction, even if it is also dealt with in civics, during the course of the four year general education secondary school curriculum. The pupils first gather various press clippings and other sources of information concerning alcoholism. Some pupils visit local government bodies and interview their representatives. Each pupil is also asked to prepare adequate anti-alcoholic campaign slogans for the first lesson.The purpose of this topic is to acquaint pupils with the influence of alcohol on the human organism. The following questions are then dealt with in class: which beverages should be included among alcoholic drinks; alcohol as a drug; information gained from interviews with members of local government bodies; the consumption of alcohol in the world, in Poland, in the vicinity of the school; statistics concerning the consumption of alcohol; the screeing of a film on alcoholism; the damage done to the human organism by alcohol consumption. Pupils then fill in a questionnaire which is anonymous.

health-care education, education against alcoholism, general education secondary schools - 147313.

191. KAPLAN, H.:
Probleme beim Thema "Rauchen" - Darlegungen zu ihrer Bewältigung (Problems connected with the topic "Smoking" and various aspects of overcomming them)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 12, pp. 364-367.

Smoking is dangerous, especially for young people. Constantly younger age groups are beginning to smoke. For this reason the Ministry of Education in the FRG in 1979 and 1981 issued special regulations concerning smoking. But the situation has not improved because advertisments for cigarettes continue, young people can buy tobacco products and many schools are not capable of doing away with informal smoking clubs and corners and smoking continues to be among young people a symbol of being adult. Also too many teachers continue to smoke. The author suggests anti-smoking education should be implemented already in the course of teacher training; pupils should have a model of a non-smoking teacher and the should be active in their negative attitude towards smoking. During biology instruction the harmful effects of smoking should be shown, as well as those of alcohol. In schools, not even cleaning women should smoke, the whole building should be without smoking and tobacco. A teacher who has a serious attitude towards his profession cannot smoke. He is in the same situation as a physician who smokes and advises his patients to stop smoking. Anti-smoking education also belongs to civics instruction, where the damage done to the national economy should be stressed (the cost of invalidity, a threat to safe traffic, etc.). Expenditures for smoking in the FRG now exceed 30 billion marks annually. In mathematics, examples concerning smoking can be calculated. Also in teaching the mother tongue and foreign languages education against smoking can be carried out. The author describes his own experiences at a general education secondary school. The following events can be organized: organizing a market for non-smokers where various slogans, buttons, t-shirts and posters against smoking are exchanged, the screening of films which show the damage to health done by smoking, various games for non-smokers, etc. In conclusion the author makes suggestions for measures which the Ministry of Education should take, including the introduction of a mandatory subject in all teacher training shools concerned with health-care education.

Such a subject should also be included into the cirriculum of secondary schools where a teacher should be charged with taking the iniciative in anti-smoking education and counselling. At least once a year this teacher should organize a school conference on smoking and alcoholism. Also advertisments for tobacco products should be banned and the sale of these products in automats should be prohibited. It should be the responsibility of the school principal to make his school cigarette-free and to provide pupils with various activities at intermission time so that they have no time for smoking.

health-care education, smoking, education against smoking - 147313.

192. KORALEWSKA-BATURA, E.:

Prawidłowe żywienie (Correct nutrition)

Biologia w szkole, 35, 1982, No. 1, pp. 42-43. 1 tab.

The author provides suggestions and recommendations for teaching the topic Correct nutrition in the 4th class of basic school. The teaching syllabus concerning this topic stresses especially various sources of proteins. The aim of teaching this topic is to show pupils the main principles of correct nutrition and to acquaint them with the consequences of malnutrition, as well as overeating, how a person should plan the composition of his own food, how fruits and vegetables should be handled and/or cooked, etc. The main teaching media used are tables of nutritional values and a summary of the nutritional values of various foods. The course of the lesson is described in detail.

health-care education, correct nutrition, basic school - 147313.

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193. KRIVOBOKOVA, S.S. - SURMINADZE, R.C.:
Zdravookhranenie v SSSR (Health care in the USSR)
Biologiya v shkole, 56, 1982, No. 5, pp. 7-12.

One of the important tasks of the Soviet state is to care for the health of the people. Attention was paid to this problem already at the 2nd Congress of the Social Democratic Workers Party of Russian in 1903. During the first years after the founding of the USSR, more than 200 decrees were issued concerning health care. The authors first deal with the historical aspects of the problem and with healthcare today. They for instance cite the number of graduates of medical schools, the outstanding success of the Soviet health care system in individual Union republics, etc. In conclusion they assess the existing situation.

health care, USSR, history, contemporary situation - 147313.

194. MANOR, C.R.:
Please Don't Eat the Daisies (A Guide to Harmful Plants)
The American Biology Teacher, 44, 1982, No. 1, pp. 33-36.
9 figs., lit. 8.

Poisonous mushrooms are quite well known and certainly better known than poisonous plants, shrubs or trees whose fruit, bloom ot other part of the plant can cause nausea, long-term damage or even death. The author cites data according to which annually thousands of children have to be treated for having eaten poisonous plants or their parts. He cites those plants with which children can most often come into contact, such as for instance Vitus sp., Menispermum canadense, Pastinaca sativa and a number of others, where the danger of internal poisoning is greatest (Datura stramonium, Taxus brevifolia). School children should become acquainted with these plants and thus protect not only themselves, but also younger playmates.

health-care education, poison + plant, instruction + + botany - 147313.

195. **PAPÁČEK, M.:**

Protialkoholní a protikuřácká výchova a praktická cvičení z biologie na gymnásiích (Education against smoking and drinking alcoholic beverages and practical excercises in biology in general education secondary schools)

Přírodní vědy ve škole, 33, 1981-1982, No. 10, pp. 364-368. 4 figs., lit. 14.

The article deals with problems of education against alcohol drinking and smoking in general education secondary schools. The author suggests that existing forms of this type of education should be supplemented with others, especially practical excercises and demonstrations of the effect of alcohol and nicotine on animals; he provides instructions on how to carry out such excercises. This type of excercise is also suitable from the point of view of the increased number of experiments required by the teaching syllabus for biology. As far as alcohol is concerned, its pharmacological effects should be demonstrated, its influence on the heart, respiratory system, its other effects (thermoregulatory disorders, breakdown of the digestive tract), the breakdown of ethanol in the blood,etc. As far as nicotine is concerned the author describes the preparation of nicotine, a demonstration of its pharmacological effects, its influence on the central nervous system, on the heart and blood circulation, on respiration, its other effects (including carcinogenic) and the course of nicotine breakdown in the organism. The author recommends the use of Daphnia magnum and the nymphs of the Mayfly for these purposes. These practical excercise are suitable for the 4th class of general education secondary schools, within the framework of human biology and general biology and also for elective biology seminars in the 4th class or as a practical biology excercise in the 2nd class (according to the new concept of teaching). Both alcohol and nicotine influence basic physiological functions, the coordination of movement, sensory coordination and especially the spatial orientation of all animals. Both substances are also highly toxic.

health-care education, smoking, education against smoking, alcohol, education against drinking alcoholic beverages, practical excercises, instruction + biology, general education secondary schools - 147313.

196. SHUTOV, I.S.:
Oznakomleniye shkolnikov s nekotorimi priemami dovrachebnoy pomoshchi (Acquainting pupils with some first aid methods)
Biologiya v shkole, 56, 1982, No. 1, pp. 51-56.

The author deals in detail with first aid measures when the afflicted person has ceased to breath or his heart has ceased to beat. These vital functions are studied in practical excercises in human physiology. The author provides detailed instructions on how to explain and teach mouth-to-mouth artificial respiration and how to massage the heart. He describes individual stages of artificial respiration, heart massage and finally a combination of both. The article also contains detailed instructions on how to make a training device on which the pupils can learn these first aid measures. The device should include an electrical control light which signalizes the correctness of the intervention. Pupils, supervised by a teacher, can make the training device by themselves on the basis of the drawings in the article.

health-care education, first aid, articicial respiration, heart - 147313.

197. TAYLOR, T.G.:
What is Nutrition ?
Journal of Biological Education, 16, 1982, No. 2, pp. 97-99.

The author, who is a professor at the University of Southhampton, here comes to the conclusion that the general public has quite insufficient knowledge concerning nutrition. He explains nutrition as a branch of applied science, which is based on physiology and which is closely linked to such sciences as pathology, microbiology, immunology, psychology, pharmacology, etc. Nutrition is also in a certain sense a branch of the social sciences and since there is a close correlation between nutrition and health, a person at an early age forms specific nutritional habits. For these reasons it is imperative that children in school learn about correct nutrition. It can be studied at different levels and from the point of view of various subjects, but most specifically within the framework of biology instruction. Knowledge concerning nutrition is also indispensable for medicine, dietetics, education, and of course agriculture.

health-care education, instruction + biology, nutrition - 147313.

198. VERORINE, M.F. - PLAT, P.:
Alcool et grossesse ... Alcool et l'enfant (Alcoholic beverages in pregnancy ... alcohol and the child) Biologie, Géologie, 69, 1982, No. 2, pp. 431-444.

At present there are 4.5 million people in France who drink excessively. About 2 million suffer from diseases which stem from alcoholism and of this number, 600 thousand are women. In other words one out of four persons suffering from disease caused by alcoholism is a woman. The authors describe the diseases which originate in alcoholism, their course and especially the influence of alcohol on the female organism, on the course of a pregnancy, the influence of alcohol on the foetus and on the neonate. The article is highly suitable as the basis for a lecture within the framework of education against drinking alcoholic beverages in the upper classes of general education secondary schools, as well as other types of secondary schools.

health-care education, education against drinking alcoholic beverages, alcohol + women - 147313.

6.89 Sex education in biology instruction

199. FLANNERY, M.C.:
New Developments in Reproductive Biology
The American Biology Teacher, 44, 1982, No. 7,
pp. 434-436, 442.

The author, who is a specialist in reproductive biology, here discusses the biological differences between both sexes, influences upon reproductive capability, deterents to sexual intercourse and how they develop. She also discusses the difference in the brains of men and women, the human endocrinal system as a whole and the importance of glands and their secretion. Also birth control, physical causes of impotency and mental disorders, alcoholism and drug abuse are briefly mentioned in this context. A special section of the article is devoted to hormonal therapy and its effect on the glands, as well as the resistance of some organs to infection.

sex education, reproduction + humans, birth control - 147313.

200. KHRIPKOVA, A.G. - KOLESOV, D.V.:
Gigienicheskoye i polovoe vospitanie uchashchikhsay obshcheobrazovatelnikh shkol (The hygienic and sex education of pupils in general education schools)
Biologiya v shkole, 56, 1982, No. 1, pp. 57-59.

In this article, which continues in an article published in issue No. 6, in volume 55, 1981, the authors provide teachers with advice on how to teach the topics mentioned in the title, which forms a part of the topic The Higher Nervous System. The authors also explain how the teacher should explain to pupils, in the form of a discussion, the importance of good and bad habits, and how pupils should correctly study, rest and sleep. Attention should also be paid to a discussion on the damaging effects of alcoholic beverages and smoking, the possibility of becoming addicted to these substances and their influence on a person's health.

education + hygiene, sex education, education against alcohol drinking, education against smoking - - 147313.

201. RUSSEL TEPASKE, E.:
Writing in Biology: One Way to Improve Analytical Thinking
The American Biology Teacher, 44, 1982, No. 2, pp. 98-99.

Expressing oneself in writing is one of the weak spots of a biology education. Written essays in biology are very infrequent, and so students only rarely are forced to excercise this mode of expression and analytical thinking. Only in Britain do biology teachers give their students essays to write. The author provides various recommentations on how to improve the situation. The subjects of essays can include a description of a biological phenomenon, a critical review of a biological paper or an article by a non-biologist on a subject which concerns biology, such as: "Adolescent girls play around with sex, for which they are not yet mature enough because what they really want is love, while adolescent boys play around with love, for which they are not yet grown-up enough, because what they really want is sex".

sexual education, instruction + biology, written essays - 147313.

202. TUNNICLIFFE, S.D.:

The Stages of Birth: Planning of Birth. Education: Planning a Policy

Natural Science in Schools, 20, 1982, No. 2, pp. 35-37. 2 tabs.

As far as humans are concerned, the term birth is very specific and it pertains only to them; for this reason children should be acquainted with this specific aspect already from 2 years of age. The author describes seven stages of acquainting children with the technology, sociology, culture, sexuality, ethics and essence of parenthood. She comments these stages in detail and provides various examples. This type of education is very important for the subsequent attitudes of young people towards each other and towards society.

sex education, education towards parenthood - 147313.

6.90 Educational and vocational guidance in biology instruction

203. KOTIK, J.V.:

Uchenicheskaya brigada - shkola kadrov dlya selskogo khozyastva (A pupils' work team - a school for future agricultural personnel)

Biologiya v shkole, 56, 1982, No. 4, pp. 63-64.

One of the important tasks of vocational guidance in schools is to arouse in pupils an interest in agriculture. The author provides information on his own work with a pupils' work team in a secondary school in

Yablunsk in the Gusyatinski district of the Ternopol region of the Ukranian Soviet Socialist Republic. Various forms of education towards agriculture are used, lessons are devoted to this aim, as well as research work in biology, excursion outdoors and visits to agricultural operations. The school has a hobby club devoted to agriculture and to making the immediate vicinity of the school more beautiful. The agricultural work teams made up of pupils cooperate with agricultural enterprises in the vicinity in verifying various new strains of plants. The pupils thus gain first-hand knowledge of work in agriculture.

vocational guidance, agriculture, instruction + biology - 147317.

204. SAPAROV, S.M.:
Iz opita proizvodstvennikh brigad Sayatskogo rayona Turkmenskoy SSR (On the experiences of pupils' work teams in the Sayatsk region of the Turkmenian SSR) Biologiya v shkole, 56, 1982, No. 4, pp. 64-65.

The author describes the extensive experiences he has gained in working with pupils' work teams in the Sayatsk region of the Turkmenian Soviet Socialist Republic where pupils help in the cultivation of cotton. The region has a total of 33 such teams which include a total of approximately 260 pupils. Every cotton field worked by the pupils in effect becomes an experimental plot of land. In 1976 the teams harvested 38 metric centners per hectar and in 1980 already 43 metric centners per hectar of cotton. The pupils from the 7th to 10th grades, under the supervision of experienced educators, together with the tractorists of the local machine station learnt to drive tractors and became acquainted with the work of cotton cultivation. The work of the teams begins in the spring, is planned and has so far been very successful. The author describes the various types of work done.

vocational guidance, pupil + work brigade - 147317.

205. STEFKA, A.D.:
Nasochvane poznatelnite interesi na uchenitsite i profesionalnoto im orientirane chrez krzhoka "Bdeshch selektsioner" (The supervision of the cognitive interests of pupils and their vocational guidance through the hobby club "Future Selection Specialist") Biologiya i khimiya, 25, 1982, No. 2, pp. 38-41.

The activities of hobby clubs as the most frequently used form of extracurricula activities in biology are aimed at extending and deepening knowledge gained in classwork and to contribute to the forming of a dialectical Marxist worldview, as well to develop the skills of pupils and teach them how to work independently with literature, develop a liking for team work and to form valuable personal characteristics such as good disciplin, diligence, curiosity and precision. At the same time a contribution is made to the vocational guidance of pupils. The hobby clubs are for pupils in the 8th to 10th classes. The members of the club carry out various phenological observations, experiments in plant and animal selection and breeding, as well as excursions during which biological material is collected for use in class. This extracurricula work is reflected in the choice of a future occupation, in successful participation in biological Olympiads and in the forming of a permanent interest in biology.

instruction + biology, vocational guidance, hobby club - 147313.

6.91 Education towards parenthood in biology instruction

206. POLIAKOVÁ, E.:
Význam výchovy k rodičovství (The significance of education towards parenthood)
Přírodní vědy ve škole, 33, 1981-1982, No. 7, pp. 242-243.

One of the prerequisites of forming a mature personality is the forming of adequate relations towards a spouse, towards marriage and the family. Marriage and a family represent extremely important social relations. In Czechoslovakia the Law on the Family requires that children be educated towards family life. It seems clear that teachers are not adequately trained to carry out education towards family life and parenthood, in spite of the fact that schools have an exceptional role to play in this context. The article discusses the aims and tasks of education towards parenthood, as well as its content. A comparison is made between the past, present and future in this context. To be a good parent requires that a person be a good person, be successful on the job and as a citizen, to have one's own aim in life and personal preferences, to have a good relationship towards people and a respect towards one's own child. In educating a child we are at the same time educating ourselves; this often requires that we acknowledge the priority of social and emotional relations before sexual relations. Thus education towards parenthood includes a whole spectrum of relations. In the broad sense of the word, education towards parenthood also includes sex education and complex training for a parental role. It should include such topics as the structure of the family and its life, the roles of individual family members, health-care habits, sexual roles, the physical development of family members, the economics of family life and socialization abilities.

education towards parenthood, ČSSR, sex education - - 147313.

7.13 Problem teaching

207. BLUM, A.:

The Rose Detective - a Strategy to Train Pupils in Reading Bio-technical Texts

Journal of Biological Education, 16, 1982, No. 3, pp. 201-204.

Many teachers wish that their pupils would be able to read articles in specialized or popular journals, just as adults do, but usually the technical terms used and the style of such articles is difficult for children to understand. The author describes how the text of a specialized article can be made enjoyable, so that the pupils learn as much as by reading the original. The Rose Detective cited in the title is a boy who cultivated beautiful roses, but would not divulge the secret of his success. Another boy therefore began to observe him in the style of a detective and to describe in his won words what the specialized journal described in specialized terminology.

problem instruction, terminology, descriptions - 147313.

208. KOSTOVA, Z.:
Psikhologo-pedagogicheski osnovi na izsledovatelskiya podkhod v obuchenieto po biologiya (The psychological and pedagogical foundations of a problem approach to biology instruction)
Biologiya i khimiya, 25, 1982, No. 2, pp. 27-34.
4 tabs.

The learning process can be considered a single whole with three mutually interconnected components: a) independent variables such as for instance organizational forms, instruction methods and the material basis of teaching); b) occasionally variable components, for instance intellect, cognition and practical activities, learning activities; c) dependent variables, for instance knowledge and skills acquired by pupils and their creative possibilities. Instruction in the course of research simulates scientific research in biology. This assumes the active seeking of new knowledge and learning new skills on the part of pupils. The main elements of this process are the formulation of a problem, the formulation of a hypothesis, carrying out an experiment, analysing its findings and discovering new laws of science. From this point of view the author analyses individual components of the teaching process and assesses their significance in each stage of acquiring knowledge.

instruction + biology, problem teaching - 147313.

7.6 Biology curricula and teaching syllabi

209. CICHY, D.:
Normy wymagan dla uczniow klasy VI. (Standard requirements for pupils in the 6th class)
Biologia w szkole, 35, 1982, No. 4, pp. 204-209.

The author discusses standards of requirements in biological knowledge for pupils in the 6th class. She cites 35 different items. For instance in the topic Chordata, pupils should be able on the basis of a picture to determine the body structure and way of life of the Amphioxus and to draw an outline of its body; to draw and describe fish genera and outline their body structure and on the basis of a fish skeleton describe the internal and external features of a fish's body; describe the reproduction of fish and clarify their heterosexuality; clarify the relation of fish and the biology of their development; explain the importance of fish and the need for their conservation; on the basis of a Statistical Yearbook make a survey of fishing in the world and in Poland; cite the names of five fresh water fish and 5 marine fish; identify a carp and a pike among other fish. In a similar manner the skills and knowledge of pupils are summed up for other topics. A unification and standardisation of requirements, as far as knowledge is concerned, is important both for teachers and the uniform marking of pupils.

instruction + zoology, basic school, requirements + standards, knowledge, skills - 147307.

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210. Diskusia k novým osnovým biológie, chémie a zemepisu pre gymnázia (A discussion on the new teaching syllabi for biology, chemistry and geography for general education secondary schools)
Přírodné vědy ve škole, 33, 1981-1982, No. 6, pp. 202-217.

On the basis of decisions made by the Ministries of Education of the Czech and the Slovak Socialist Republics educational journals are submitting for public discussion the teaching syllabi of individual teaching subjects for the first and second classes of general education secondary schools; these syllabi have been drawn up in accord with the document concerning the further development of the Czechoslovak educational and teaching system and are at present being verified in selected schools. The article also includes the draft of teaching syllabi for 1st and 2nd class of general education secondary schools for the subjects biology, chemistry and geography. These syllabi have been drawn up by the staff of the Pedagogical Research Institutes in Prague and Bratislava. They modernize the content of what is taught, as well as the teaching methods and organizational forms of instruction used, since the teaching syllabi now in use in general education secondary schools are no longer in accord with the existing state of biological, chemical and geographical sciences, and with the practical needs of society. A new system of biology instruction has been formed which includes the most recent findings of the biological sciences (concerning the cell, noncellular, unicellular and multicellular organisms, concerning man from the point of view of heredity and the variability of organisms, as well as contemporary findings concerning phylogeny). The concept of the new teaching syllabi stresses general biology, biological processes and principles, which are valid for all living organisms and which are taught in independent teaching units. The biological subject-matter culminates into philosophical aspects. The thematic units of the new biology syllabi include the following: General characteristics of living systems; A survey of natural systems of living organisms (1st class); Vital functions at the level of higher organisms (2nd class); The continuity of life; Man as the highest link in the development of the animal kingdom; The foundations of ecology; The significance of biology for the contemporary development of science and technology; Biology and philosophy (3rd class). This new organization of the subject-matter of biology makes it possible to make greater use of comparisons, observations and experiments, especially in the form of laboratory work, where it is possible to use extensively literature and seminar forms of work. In every year of the course the organization of biological seminars and excercises are assumed, which will take up one third of the teaching time available. The significance attached to biology is very high, since it will have a decisive influence on the present and future development of society; at the same time it greatly influences the development of the intellect, as well as moral characteristics of the individual. In selecting the subject-matter for biology teaching, the educational and teaching objectives of school should be taken into account, as well as the existing trends in the development of biological sciences, the practical utilization of biology on behalf of society, the age-specific characteristics of the pupils and relations towards other teaching subjects. The syllabi are conceived as a spiral which is continuous, going in an upward direction and is operative.

1st class: Introduction (3 lessons); The biological sciences (1 lesson); Methods of scientific work used in biology (1); The history of biology (1); General characteristics of living systems (16+4); The differences between living and non-living nature (4); The cell (6); Multicellular organisms (6) + (2 hours of excercises); A survey of a natural system (2+2); The nucleus (47+21); The fungi kingdom (4); The plantae kingdom (16 + 8.2 of excercises); The animal kingdom (22+12).

2nd class: Living functions at the cellular level, the cell as an elementary living system (3); The intake and output of matter by the cell (2); The energy economy of the cell (3); The synthesis of important substances by the cell (2); Reproduction of cells (2); Excercises (6); Living functions at the level of higher organisms - the nutrition of plants(5); Respiration (2); Growth processes of plants (2); The reproduction of plants (1). The movement of plants (2), The unity of the plant body (1); Excercises (6); The vital functions of animals and humans: the significance of studying animals and humans (1); Regulation in the animal world (1); The intake of matter (food) from the external environment by the organism of animals and humans (1); The processing of food by an organism - the digestion of nutritions substances (1); The metabolism of animals and humans (1); The temperature of humans and animals as a consequence of and prerequisite for metabolic functions (1); The exchange of gases among organisms in the external and internal environment of organisms (2); Body fluids in animals and man (2);

The circulation of body fluids (2); The function of the excretion system (1); Hormonal regulation (2); The regulatory function of the nervous system in animals and man (3); The sensory function of stimulation and the regulatory system - the sensory organs (2); The motor functions of stimulation and the regulation system - the function of muscles and the movement of organisms (2); The function of protective mechanisms (1); The functional principle of ontogenic development in the animal kingdom (2); Excercises (12); Genetics: basic genetic terms (1); The molecular foundations of heredity (2); The cell and heredity (3); The heredity of multicellular organisms (6); Genetic variability (2); Heredity in a population of organisms (2); The significance of genetics (1); Excercises (8).

instruction + biology, general education secondary school, teaching syllabi - 147307.

211. Entwurf des überarbeiteten Lehrplanes Biologie Klasse 10. (The draft of a new biology teaching syllabus for the 10th class)
Biologie in der Schule, 31, 1982, No. 2-3, pp. 57-68.

The article cites the draft of a new biology teaching syllabus for the 10th class. Each thematic unit is described in detail from the point of view of its content and the scope of the subject-matter to be taught, including the number of hours devoted to each topic. The thematic units have the following sequence: 1. An introduction to genetics and phylogeny; 2. Genetics; 2.1. Mendel's laws; 2.2. Repetition and systemization; 2.3. The cellular basis of heredity; 2.4. The molecular basis of heredity; 2.5. Repetition and systemization; 2.6. The interaction of internal and external factors in the implementation of hereditary factors; 2.7. Systemization; 3. Evolution; 3.1. Evolutionary theory; 3.2. The development of life on Earth; 3.3. The phylogeny of plants and animals; 3.4. The phylogeny of man; 3.5. The history of evolutionary theories; 3.6. Repetition and systemization.

draft + teaching syllabi, instruction + biology, secondary school, 10th class, general biology, genetics, evolution - 147307.

212. FRONĚK, J.:

Ke změnám prozatímních osnov chemicko-biologických praktik v 7. ročníku základní školy (Concerning changes in the provisional teaching syllabi for chemical and biological practical excercises in the 7th class of basic school)

Přírodní vědy ve škole, *33*, 1981-1982, No. 5, pp. 168-169.
Lit. 4.

In experimental schools joint practical excercises in chemistry and biology have been taking place for 4 years. They are now the most frequently enrolled elective subject. Out of 100 experimental schools, in 1978-79, 49 schools gave priority to this teaching subject and in 1979-80 this number increased to 72 schools. In the majority of regions this was 1st choice among elective subjects. Teachers have pointed out that the share of biology in the excercises is too small (40 % of the teachers). For this reason the teaching syllabus for this subject has now been supplemented with an 8 lesson sequence called "The collection, identification and preservation of plant and animal material." The author acquaints the reader with further changes in the provisional teaching syllabus and comments some of these changes. A total of 20 lessons are devoted to experimental techniques used in biology.

biological practical excercises, instruction + biology, instruction + chemistry, experimental schools, teaching syllabi + experiments - 147307.

213. Für und wider - zum Entwurf des überarbeiteten Lehrplanses für Klasse 10 (The pros and cons of the draft of a new teaching syllabus for the 10th class) Biologie in der Schule, 31, 1982, No. 7-8, pp. 321-326.

Five biology teachers here express their opinions on the draft of a new biology teaching syllabus for the 10th class. Each expresses his opinion on the structure of the syllabus, the opportunities it provides and its worldview components, as well as the amount of time available for individual topics and how well it provides opportunities for developing pupils' activities, etc.

draft + teaching syllabus, instruction + biology, sedoncary school, 10th class, discussion, GDR - 147307.

214. Für und wider - zum Entwurf des überarbeiteten Lehrplanes für Klasse 10 (The pros and cons of the draft of a new teaching syllabus for the 10th class) Biologie in der Schule, 31, 1982, No. 9, pp. 372-376.

The continuation of a discussion concerning the new concept of biology teaching, this time written by one biology teacher and by a specialist in the didactics of biology. First the authors assess the outcome of the preceding discussion and the various problems which have been stressed during the discussion, such as the structure of the subject-matter, pupils' activities in class, the use of the syllabus for worldview education, the time aspects of the syllabus and possibilities for the verification of what has been taught.

draft + teaching syllabus, instruction + biology, 10th class, secondary school, discussion, GDR - 147307.

215. Für und wider - zum Entwurf des überarbeiteten Lehrplans für Klasse 10 (The pros and cons of the draft of a new teaching syllabus for the 10th class) Biologie in der Schule, 31, 1982, No. 10, pp. 423-427.

The continuation of a discussion concerning the new concept of biology teaching in the 10th class; here 6 biology teachers express their opinions. They discuss the structure of the teaching syllabus, the opportunities it provides for teaching and for world-view education, the relation between the subject-matter to be taught and the time available, the activities of pupils in class and the possibility of effectively verifying the outcome of instruction. Greatest attention is devoted to changes in the structure of the subject--matter.

draft + teaching syllabus, instruction + biology, 10th class, secondary school, structure of subject--matter, discussion - 147307.

216. Für und wider - zum Entwurf des überarbeiteten Lehrplans für Klasse 10 (The pros and cons of the draft of a new teaching syllabus for the 10th class) Biologie in der Schule, 31, 1982, No. 11, pp. 467-470.

A continuation of a discussion concerning the new concept of biology teaching in the 10th class of secondary school. Here two representatives of Marxist philosophy, who specialize in the relationship between practical life and the subject-matter taught in school and its worldview aspects express their opinions. They also concentrate on opportunities to define the relationship between biology and social factors in the context of anthropogeny and ontogeny.

draft + teaching syllabus, instruction + biology, 10th class, secondary school, worldview education, discussion - 147307.

217. Für und wider - zum Entwurf des überarbeiteten Lehrplans für Klasse 10 (The pros and cons of the draft of a new teaching syllabus for the 10th class) Biologie in der Schule, 31, 1982, No. 11, pp. 522-526.

The continuation of a discussion concerning the new concept of biology teaching in the 10th class of secondary school, this time written by 5 biology teachers and specialists in the didactics of biology, who here submit their own suggestions concerning the subject-matter to be taught, as well as its structure and the amount of time allocated to various topics.

draft + teaching syllabus, instruction + biology, 10th class, secondary school, analysis of content, structure of subject-matter - 147307.

218. HOCKE, C.:
Zur Einführung des überarbeiteten Lehrplans Biologie Klasse 8 (Concerning the introduction of the new biology teaching syllabus for the 8th class) Biologie in der Schule, 31, 1982, No. 2-3, pp. 99-103.

The author first analyses the reasons which led to the drawing up of a new biology teaching syllabus for the 8th grade. Its main purpose was the forming of positive conditions in which pupils might learn solid and applicable knowledge, skills and abilities,

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as well as gaining enough time in which to persue worldview education and to stress the essential. The author provides a survey of topics and teaching units and the number of lessons devoted to each.

draft + teaching syllabus, basic school, 8th class, worldview education - 147307.

219. KEMPE, R.:
Für und wider - zum Entwurf des überarbeiteten Lehrplans für Klasse 10 (The pros and cons of the draft of a new teaching syllabus for the 10th class)
Biologie in der Schule, 31, 1982, No. 5, pp. 195-196.

In the author's opinion the structure of the subject-matter in the new syllabus is satisfactory. The principle according to which pupils proceed from the macroscopic to the microscopic and the molecular is easily understandable. The practical use of what is taught (for instance in human biology) is very well shown. But two lessons are too short to deal with an instroduction to genetics and phylogeny. The author also points to some problems concerning the relation between the subject-matter to be taught and the amount of time allocated to its teaching in other cases.

draft + teaching syllabus, instruction + biology, 10th class, structure of subject-matter, genetics, phylogeny - 147307.

220. LACOMBE, G.:
Quelques réflections sur les Programmes de Seconde
(Some comments on the biology curriculum in secondary school)
Biologie, Géologie, 69, 1982, No. 2, pp. 343-346.

The author offers comments on a recently issued biology curriculum for secondary schools. She points out that while some topics are repeated in geography (the subject-matter of eco-systems), the subject-matter of photosynthesis is insufficiently covered. Also the aspect of the history of the natural science is not taken into account sufficiently. Too many specialized terms are used, which are incomprehensible for pupils. Basic factors such as history, the climate, the soil and the bedrock do not have sufficient time devoted to them.

curriculum, instruction + biology, secondary school, criticism - 147307.

221. MATZKE, M.:
Zum aktuellen Thema, Zur Behandlung humangenetischer Inhalte - Ein Diskussionsbeitrag zum Entwurf des überarbeiteten Lehrplans Biologie Klasse 10 (Concerning a current problem. The teaching syllabus on human genetics - a contribution to the discussion on the draft of a new biology teaching syllabus for the 10th class)
Biologie in der Schule, 31, 1982, No. 10, pp. 428-433.

The topic Human genetics contains a number of opportunities to develop worldview education, as well as political and moral education. A negative aspect of the new teaching syllabus is that it does not contain this topic at all, but a positive factor is the fact that the sum of knowledge taught concerning human genetics is actually greater that before, because it is included in such topics as Mendel's laws, The chromosome theory of heredity, Mutations, The interaction of external and internal factors in heredity. The author also suggests that 4 lessons be taken over from the existing teaching syllabus concerning the objective of the course and the application of knowledge.

draft + teaching syllabus, instruction + biology, secondary school, 10th class, genetics - 147307.

222. *Miniserstwo oświaty i wychowania. Instytut programów szkolnych: Program biologii z higiena, dla klasy VI.* (The Ministry of Education and the Institute for School Curricula: The biology and hygiene teaching syllabus for the 6th class)
Biologia w szkole, *35*, 1982, No. 4, pp. 195-203.

The Polish Ministry of Education has approved a new teaching syllabus for the 6th class of basic school. The syllabus was drawn up by a team of twenty authors, which are all cited. The syllabus will be introduced in the school-year 1983-1984. It contains not only the subject-matter to be taught but also a description of excercises on individual topics and a list of various skill which pupils should learn. The main topics include the following (with the number of lessons devoted to their instruction): The variability of chordata - 29; of this number - Vertebrates: fish (6), amphibians (5), reptiles (5), birds (5), mammals (6). The variability of forms of living organisms (28); of this number - a comparison of cellular organisms and organisms with tissue (2), mosses (6), ferns (6), blooming plants (14), gymnosperms (5), angiosperms (9). The basic classification of plants and animals (6), the school garden (6), environmental conservation (6). The teacher has 5 lessons at his disposal to use as he thinks fit. A total of 80 biology lessons are taught in the 6th class.

instruction + biology, basic school, 6th class, teaching syllabus - 147307.

223. NGA, B.P. - GIAO, N.T. - MATZKE, M.:
Zur Entwurf eines neuen Biologielehrplans im Rahmen der Bildungsreform in der Sozialistischen Republik Vietnam (Concerning the draft of a new biology syllabus within the framework of an educational reform taking place in the Socialist Republic of Vietnam).
Biologie in der Schule, 31, 1982, No. 11, pp. 488-490.

In South Vietnam after the liberation there were provinces in which only every fifth child attended school. Beginning with the school year 1981-1982 a new unified school system has been introduced for the whole territory of Vietnam. A 9 year general education school exists for all children and the 10th, 11th and 12th classes represent secondary education. Changes also concern the biology course. Biology will be taught in the 6th to 9th classes, 66 lessons per year. In the 6th class plant morphology will be taught, in the 7th class plant systematics and systematics of invertebrate animals, in the 8th class vertebrates together with zoogeography, evolution and animal breeding, in the 9th class human anatomy, physiology and hygiene. General biology, including genetics and evolutionary theory will be taught in secondary school.

9 year general education schools, general education secondary schools, instruction + biology, Vietnam - 147307.

224. PLADEK-STILLE, J.:

Kybernetische Aspekte im Biologieunterricht. Eine Unterrichtsreihe in einem Grundkurs der Jahrgangsstufe
(Cybernetic aspects of biology instruction. The topics in the basic course taught in the 12th class)
Der Biologieunterricht, 18, 1982, No. 3, pp. 4-41,
2 figs., 7 outlines, 9 appendixes, lit. 28.

Cybernetics is now becoming a part of the biology teaching syllabus. The instructions concerning the biology syllabus in the North Rhine and Westphalia land for instance recommend stressing cybernetical aspects in the topic Regulation. Cybernetics can be made use of in various biological sciences, for instance in physiology, ecology and genetics. This subject-matter is especially suitable for the 12th class, but great care should be devoted to deciding what to include and in the context of which biological topic. In physiology when explaining metabolic processes and in nerve regulation and the processing of information by an organism, cybernetical concepts can be very useful. Pupils can be asked to enumerate objects with cybernetic properties and learn such basic cybernetic terms as control, regulation, positive and negative feedback, problems connected with a black box, inputs and outputs, the system categories of management theory, etc. On the basis of the observation of biological phenomen it is possible to derive cybernetical aspects and seek their solution, as well as use them to describe regulation phenomena of living organisms. A study od bio-cybernetical problems can help to analyse structure and function, and to create useful models, etc. The author provides the outline of a teaching unit on these problems for 10 lessons.

instruction + biology, secondary school, cybernetics - 147 307.

225. SÍBERT, P.:
K realizaci nového pojetí přírodopisu v 6. ročníku základní školy (On the implementation of the concept of nature studies in the 6th class of basic school)
Přírodní vědy ve škole, 33, 1981-1982, No. 1, pp. 2-3.

In the school year 1981-1982 a new concept of nature studies was implemented in the 6th class of basic school. The whole 6th class is taken up by zoology, which includes a basic selection of problems concerning a number of basic biological sciences - anatomy, morphology, physiology, parasitology, zoogeography, ecology, ethology, systematic and applied zoology. The whole syllabus is based on an evolutionary point of view, upon the concept of the evolution of organisms in the context of the evolution of plants. In work with the zoology textbook, stress should be placed on the forming of zoological notions and learning terms, on suitable motivation and on the applicability of the subject-matter. The zoology syllabus is divided into 9 units, which are mostly in accord with the individual zoological phylums. Also the ecological aspect is always stressed (insects are dealt with only from an ecological point of view). All the units stress the educational aspect, especially elements of communist education and polytechnical education.
A methodological handbook for teachers accompanies the textbook, which again stresses educational and teaching objectives. The necessary teaching media for using the new textbook have been produced ahead of time and include wall pictures, slide series, film casettes, transparencies, and wall panels. Among the methods to be used in teaching are discussions, observations and experiments, independent work of pupils with natural specimens, the use of the textbook and other supplementary reading.
The teacher can use problem teaching and group teaching

methods, as well as extend the syllabus for use in hobby clubs activities.

instruction + zoology, textbook, methodological handbook, teaching media + zoology, basic school, 6th class - 147307.

226. SŁOCIAK, H.:
Refleksje nad realizacja nauczania biologii w klasie VIII
(Some comments on the implementation of the teaching syllabus in biology instruction in the 8th class)
Biologia w szkole, 35, 1982, No. 1, p. 63.

At a conference of teachers from the Wroclaw region which was held in the school year 1981-1982, the question of a new biology teaching syllabus for the 8th class was widely discussed. The conclusions from this discussion were sent to the Ministry of Education which was also asked to reverse its previous decision to decrease the number of biology lessons taught in the 8th class of basic school, from two weekly lessons to only one. In view of the important educational tasks which biology instruction in the 8th class has, especially in the context of human biology and hygiene, the teachers demand a return to two weekly lessons.

instruction + biology, basic schools, 8th class, teaching syllabus, curriculum, criticism - 147307.

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227. STREY, G.:

Die neuen Richtlinien für das Fach Biologie in der Orientierungsstufe des Landes Niedersachsen (New directives for biology teaching in the lower grades of secondary school in Lower Saxony land of the FRG) Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 10, pp. 370-372.

The new biology teaching syllabus for the lower classes of secondary school in Lower Saxony takes into consideration psychological, didactical and other aspects and it places special stress on pupils' independent work. The author, however, criticises some aspects of this new syllabus, for instance the manner in which the syllabus demonstrates relations between animals, on the basis of the exemple of the fox and the Tawny owl. The author think the Blackbird would be a better example. The problem is to properly explain causal relations, because the syllabus, besides the induction method also uses the deduction method which can however, lead to incorrect conclusions especially in ecology. For instance on the basis of deduction one might draw the conclusion that every human intervention into nature is bad and always leads to catastrophic consequences, which is incorrect. Also the objectives which the syllabus sets for itself are criticised because there are too many of them and the teaching lessons are usually too full. The criticism of the teaching syllabus aims at improving it a doing away with its negative aspects.

teaching syllabus, secondary school, criticism, education + objective, teaching + objektive, FRG - 147307.

228. SZYLANSKA, E.:
Projekt rozkładu materiału nauczania biologii dla klasy VI (80 godzin lekcyjnych) (A project for planning the subject-matter of biology instruction in the 6th class (80 teaching lessons)).
Biologia w szkole, 35, 1982, No. 4, pp. 219-225.

The author analyses in great detail the subject-matter of biology instruction in the 6th class of basic school and discusses how to divide this subject-matter into the 80 teaching lessons available for it. Her plan cites the number of the lesson, the topic to be taught, the subject-matter, didactical media to be used and the method of teaching the lesson. Among the most important methods are the following: discussions, work with the textbook, practical work, experiments, group work, exposition by teacher, demonstrations, screening of films, repetitions, observations, excursions. The author does not distinguish between instruction methods, organizational forms of teaching and cooperative forms of instruction. The plan can be a valuable aid, especially for young teachers.

instruction + biology, basic school, 6th class, teaching syllabus, teaching methods, organizational forms, cooperative forms, laboratory work - 147307.

229. TILLE, R.:
Für und wider - zum Entwurf des überarbeiteten Lehrplans für Klasse 10 (The pros and cons of the draft of the new teaching syllabus for the 10th class)
Biologie in der Schule, 31, 1982, No. 5, pp. 193-196.

In the author's opinion the structure of the thematic unit Genetics is not as well developed as some of the others, for instance Phylogeny; in a number of cases the quality of the whole syllabus is below that of the teaching syllabus in use since 1969. A better starting point for the syllabus would be the historical situation existing in the natural sciences in the middle of the 19th century, the development of Mendel's laws, an explanation of the essence of heredity and variability and then, on the basis of this knowledge, applications in human genetics and in animal breeding. The author also cites an alternative method of dividing the teaching syllabus into chapters and topics.

draft + teaching syllabus, instruction + biology, secondary school, 10th class, genetics, criticism - 147307.

230. BENEVIČOVÁ, M. - KAPSNÁ, J.:
Prvé skúšenosti z realizácie nového ponatia prírodopisu v 5. ročníku základnej školy (First experiences with the implementation of the new concept of nature studies in the 5th class of basic school)
Přírodní vědy ve škole, 33, 1982, No. 1, pp. 7-9.

The article describes first experiences with the implementation of the new concept of nature studies in the 5th class of basic school. An open biology lesson is described on the basis of the example of the topic "The development of organic substances in chloroplasts". In a similar manner an experiment for proving the presence of starch in the leaves of a Geranium plant is described in detail. The author shows how good cooperation between teachers in the lower and upper classes of basic school make it possible for pupils to make the transition from elementary to more specialized education smoothly. The pupils in the 4th class were given an assignment to collect, during the summer vacation, botanical material which was then used in classwork and in

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laboratory lessons. This collection can be carried out in the form of group work and problem teaching.

instruction + biology, teaching syllabus, 5th class, basic school, criticism, original natural objects, laboratory work - 147307.

231. CICHY, D.: - ZEBALSKA, E.:
Przebieg i wyniki badań nad projektem programu nauczania biologii z higiena w klasie VI (The course and findings of a study project concerning the biology and hygiene teaching sylabus for the 6th class)
Biologia w szkole, 35, 1982, No. 4, pp. 226-234.

A study of the new teaching syllabus for biology and hygiene for the 6th class was carried out in two stages, the first in the school year 1976-1977, the second in the school year 1980-1981. The findings were published in this journal in 1981 and were also passed on to the Ministry of Education. This report includes information concerning the methods used in the study, a theoretical analysis of biology teaching in the 6th class of basic school, the course of an experiment to verify the qualities of a new teaching syllabus, an assessment of the work done by pupils from the point of view of the newly adopted standard requirements and also a description of the changes which were made in the teaching syllabus as an outcome of the experience gained during its experimental verification. It was found that the new teaching syllabus has an optimum structure, that it contains all the required basic subject-matter, that it provides sufficient opportunities to implement the aims and objectives of instruction and that the majority of the pupils were able to achieve the required level of knowledge and skills. The structure and content of the subject-matter found in the teaching syllabus was found to have a positive influence on the education process and the course of instruction. The teaching syllabus was also subject to a detailed specialized (biological), as well as didactical analysis, with special stress on methodological approaches, interdisciplinary relations, the suitable use of teaching media and organizational forms of instruction. On the basis of the study the teaching syllabus, after some very small alterations, was approved and submitted to the Ministry of Education for definite approval.

instruction + biology, draft + teaching syllabus, basic school, 6th class, study - 147307.

232. FEIN, B. - GRÜNBERG, U. - HOCKE, C.:
Zu ersten Erfahrungen in der Arbeit der Abiturstufe nach Einführung der neuen Lehrmaterialen (First experiences with the introduction of new teaching subject-matter in the final classes of a general education secondary school)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 283-290.

The authors here attempt to generalize some of the experiences gained in biology teaching in a general education secondary school according to a new teaching syllabus. The majority of the teachers questioned assessed the new syllabus in a positive manner. Four groups of problems are specifically analysed in the article: the fact that many teachers try to teach more than is in the syllabus, the insufficient knowledge gained by pupils at the basic school level, problems connected with planning instruction and the utilization of what has been learnt in practical life and finally the educational objectives of the syllabus.

instruction + biology, general education secondary school, teaching syllabus, modernization, GDR - 147307.

233. LIEB, E.:
Einige Bemerkungen über entwicklungspsychologische Bedingungen des Biologieunterrichts in der Orientierungsstufe (Some comments on biology instruction in the lower classes of secondary school from the point of view of developmental psychology)
Der Biologieunterricht, 18, 1982, No. 1, pp. 32-36.
2 tabs., lit. 8.

The article deals with a report on the verification of a chicken's egg, (cf. an article by Leib in Biologieunterricht, 16, 1982, No. 4). The study was carried out in a classroom, where pupils were mounting the egg and in a class where the subject-matter was explained, without any practical demonstration or excercise. For instance the question of why the fertilized spot on the egg is always on top of the yoke presented difficulties for the pupils in the latter group and only 4 out of 32 answered correctly. For this reason it was decided to extend the practical work with the egg and the yoke itself was studied in a Becher retort. Also the question why when egge are in storage do they have a larger air chamber and why a fertilized egg is lighter in weight than an unfertilized egg was studied.

instruction + biology, model + instruction, laboratory work, dissection, egg + bird - 147307.

234. Po usovershenstvovannim programmam (According to improved teaching syllabi)
Biologiya v shkole, 56, 1982, No. 1, pp. 7-9.

The XXVIth Congress of the Communist Party of the Soviet Union has set the tasks for further improving teaching and education and has given the Ministry of Education the task of improving existing teaching syllabi and textbooks. The aim is to overcome the overburdening of pupils. Changes in teaching syllabi also include a strengthening of the ideological and educational aspects of the subject-matter, increasing the polytechnical aspects of what is taught and leaving out excessively complicated or unnecessary topics. One of the new items in the syllabi are standards of knowledge and skills which pupils should achieve. More attention is also devoted to the interdisciplinary aspects of various subjects, as well as developing pupils' independence in learning and the use of various teaching media.

instruction + biology, teaching syllabi, textbooks, modernization, work education, polytechnical education, interdisciplinary relations, USSR - 147307.

8.3 The didactical principle of educational instruction

235. GOLLE, B.:

Zur weiteren Erhöhung der Bildungs- und Erziehungsergebnisse des Biologieunterrichts in der Klasse 10

(Concerning the further improvement of the educational and teaching aspects of biology instruction in the 10th class)

Biologie in der Schule, 31, 1981, No. 2-3, pp. 49-56.

The teaching of genetics and phylogeny contributes to understanding the essence of life and strengthens the conviction that nature is of a material nature; it also contributes to the development of relevant skills and abilities. However, a number of reserves exist, which are still the subject of discussion; the author attempts to analyse them. He assesses the discussions on this theme and then analyses problems connected with the implementation of the existing teaching syllabi. He indicates points of departure for overcoming problems and indicates the direction which the discussion should take.

instruction + biology, teaching syllabi, 10th class, secondary school, discussion, modernization - 147307.

236. HEINZEL, I.:
Normkenntnisse im Biologieunterricht (Standards of correct behaviour in biology instruction)
Biologie in der Schule, 31, 1982, No. 1, pp. 22-25.
2 figs.

Pupils must know how to behave, why certain rules should be adhered to and they should accept demands placed on them in this context. This type of knowledge should be gained together with a knowledge of basic facts. Direct demands made upon behaviour can be formulated in various ways. On this basis the author distinguishes standards of the 1st order (which are more generalized). On the basis of practical examples she explains how these standards of behaviour should be developed.

instruction + biology, standards + behaviour. 147313.

237. HEINZEL, L. - HIRMER, A.:
Zu einem Katalog des Normwissens für den Biologieunterricht der Klassenstufe 5 (Concerning a catalogue of standardized knowledge for biology instruction in the 5th class)
The authors ask whether standardized knowledge can be formed in the course of biology instruction, and which biological facts can best contribute to the forming

of such knowledge, as well as which standards must be formed anew and which only renewed. They think a solution might be the creation of a catalogue of standard knowledge for biology teaching. The authors acquaint readers with such a catalogue for the 5th class, which concerns biology instruction, German instruction and work on the school plot of land.

instruction + biology, basic school, 5th class, standards + knowledge - 147307.

238. ZABEL, E.:
Zu Grundfragen der methodischen Gestaltung des fakultativen Biologieunterrichts (Concerning basic problems of the didactical concept of elective biology instruction) Biologie in der Schule, 31, 1982, No. 7-8, pp. 305-309.

The specific role and function of elective instruction requres the use of different didactical concepts and special teaching conditions (such as for instance small groups, a syllabus only as a framework). It would be an error to transfer the "style" of mandatory instruction into elective subjects. The author discusses especially the activities of pupils in this type of instruction. The teacher must take into account the individual specific aspects of various pupils and to form conditions for their independent activities. Pupils should be guided towards socially important problems and their activities should be organised in a manner similar to the organization of research.

instruction + biology, teaching syllabus, elective instruction, standards - 147307.

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8.8 The didactical principle of taking into account interdisciplinary relations

239. HERMANN, E. - KLAWITTER, E.:
Zur Gestaltung von Anwendungssituationen im Biologieunterricht (On forming situations suitable for the application of knowledge in biology instruction)
Biologie in der Schule, 31, 1982, No. 11, pp. 455-457.

Greater attention should be paid to how pupils are able to apply the knowledge they have gained. The authors' own experiences indicate that this is something quite difficult for pupils, because they are unable to apply the knowledge they have gained in a new context, do not know how to reproduce information selectively and they tend to apply knowledge in a literal manner. Great reserves exist in the teaching of new subject-matter. On the basis of the topic concerning eyesight, the author demonstrates how knowledge gained in other subjects (optics in physics) can be applied in related fields (biology).

instruction + biology, interdisciplinary relations - 147313.

240. KUKAN, Š.:
Mesipredmetové vztahy v učivu prirodopisu a pestitelských prác v pracovnom vyučování na základnej škole
(Interdisciplinary relations in teaching the natural sciences and plant or animal breeding in the course of work education in basic school)
Přírodní vědy ve škole, 33, 1982, No. 9, pp. 325-328.
Lit. 8

On the basis of the exemple of the new concept of teaching the natural sciences, as well as plant or animal breeding the article attempts to demonstrate how interdisciplinary relations can be implemented in basic school. The subject-matter taught in botany and zoology can have a positive effect on pupils' activities in the breeding of both plants and animals in the subject work education. The author therefore concentrates on the mutual influence of these teaching subjects on each other from the point of view of their structure and content, their subject-matter, and mutual overlapping. He is especially concerned with instruction in the upper classes of basic school. With both these subjects, interdisciplinary relations can be implemented in a purposeful manner on the basis of utilizing one subject in relation to the other, by explaining a single phenomenon from the point of view of first one and then the other subject and using knowledge in one subject to strengthen knowledge in the other. The botany syllabus for the 5th class and zoology syllabus for the 6th class supplement, and are in turn supplemented, by the work pupils do in plant and animal breeding within the framework of work education.

instruction + natural sciences, instruction + breeding work, work education, basic school, interdisciplinary relations - 147313.

241. RASHKOVA, S.:
Mezhpredmetni vrzki v obucheniyeto po biologiya
(Interdisciplinary relations in biology instruction)
Biologiya i khimiya, *25*, 1982, No. 2, pp. 34-37.

The problem of implementing interdisciplinary relations is dealt with in a fundamental manner in the theoretical work done by N.K. Krupskaya, who based her ideas on those of V.I. Lenin. The author uses the work of N.K. Krupskaya and explains various opportunities available to the teacher for correct worldview education of pupils by the clarification of dialectical laws from the point of view of biological disciplines. On the basis of practical exampled taken from the teaching syllabi of various classes, the author demonstrates how this problem can be dealt with in an unobtrusive manner.

instruction + biology, interdisciplinary relations - 147313.

242. VOESACK, L.:
Anwedendes Festigen - ein effektiver Weg zu höheren Lernergebnissen (Strengthening of knowledge based on applications - an effective way to achieve better results in learning)
Biologie in der Schule, 31, 1982, No. 6, pp. 235-237.

The knowledge of pupils in the firmer, the more attention is devoted to its strengthening. The findings of a research project from the University of Leipzig indicate that in this respect there are still many reserves. Strengthening should be concieved in such a way that knowledge is applied under specific conditions; under changed conditions the given relations require different knowledge. The opportunity for applications are in the very structure of biology subject matter, in the utilization of practical applications and the implementation of interdisciplinary relations. The author demonstrates this on the basis of the topic Human metabolism and The metabolism of a plant cell.

instruction + biology, interdisciplinary relations - 147313.

9. Methods of biology instruction

243. DUNN, R. et al.:
Hemispheric Preferences: The Newest Element of Learning Style
The American Biology Teacher, 44, 1982, No. 5, pp. 291-294. 2 tabs.

A team of authors here reports on a research project in which one section of students was orientated towards instruction which placed greater stress on visual images, while another group was formed by tho-se who prefere auditive instruction through words. While the first group concentrated on deduction, the second gave priority to induction. The team studied a total of 353 students from the ninth to the twelfth classes, with boys and girls separated in biology instruction. It was found that both groups require different methods of biology instruction, which are briefly described. The tables contain the effect of various factors on the learning of both groups (noise, light, learning with parents, etc.).

instruction methods, verbal methods, demonstration aids - 147309.

244. Myagkova, A.N.:
Rol metodi v obuchenii, vospitanii i rozvitii uchashchikhsya (The role of methods in the education, teaching and development of pupils)
Biologiya v shkole, 56, 1982, No. 5, pp. 16-22.

The introduction of a new biology curriculum aims at contributing to the further improvement of the effectiveness of instruction.However, success is to a large degree dependent upon the methods of instruction used. Instruction methods have three functions: to teach, to educate and to develop. Various possibilities of classification exist, depending on the source of knowledge and the characteristic of the pupils' cognitive activity. Specifically the author distinguishes the following methods: lecture, narration, discussion, observation, experiment, practical excercise, demonstration with ostensive aids, work with textbook. (However, practical excercises and demonstrations with ostentive aids should not be included among teaching methods). The teacher should use these methods in such a way that the cognitive activity of the pupil is developed. The author analyses individual methods from the point of view of how they fulfill the above mentioned functions and cites positive practical examples.

instruction + biology, instruction methods, classification - 147309.

245. APPLEGATE, J.E.:
An Introductory Excercise for Courses in Birding
The American Biology Teacher, 44, 1982, No. 1, pp. 14-20.
Lit. 4, fig. 3.

The observation of birds and their identification under natural conditions is quite difficult for students if they do not have extensive knowledge concerning the external characteristics of the birds in question.The author developed and tested a method which makes it easier for students under field conditions to identify birds on the basis of their physical characteristics, especially the colour of specific feathers, their size, shape of tail, feet and claws, the profile of their head, bill or beak, etc. According to these characteristics, the students enter the bird into a workbook and after this preliminary identication, an other excursion is organized, where various groups of students again identify the birds.

instruction method, instruction + biology, excursion, observation, identification key. - 147309.

9.6 Methods of work with literature (textbook, syllabus, workbook, worksheet, atlas, keys for determining flora and fauna)

246. TRAUDTE, M.
Erfahrungen und Vorschläge zur Arbeit mit dem Lehrbuch im Biologieunterricht. / Experiences and suggestions for work with the biology textbook./

Biologie in der Schule, 31, 1982, No. 1, pp. 16-21.

The use of the textbook in classwork is often connected with a number of difficulties, not only in work with the text, but also when various tables and graphic appendixes are used. To overcome this problem the author suggest procedures which she has been using successfully. She stresses a specific sequence of activities and uses elements of group instruction. She also describes how she plans, controls and assesses various activities connected with the use of the textbook. In conclusion she lists which type of activities with textbooks are best suited for work in individual classes, from the 5th to the 10th.

instruction + biology, instruction methods, work with a textbook - 147309.

247. NEUBAUER, M.:
Wie weit können wir unsere Schüler zum Bestimmen befähigen ? (To what extent can we develop in pupils the ability to identify ?)
Biologie in der Schule, 31, 1982, No. 9, pp. 370-371.

The educational value of identifications of flora or fauna is that pupils learn the principles on the basis of which it is possible to acquire further knowledge, even outside school. Pupils encounter problems when identifications are required in the 5th, 6th, 9th and 11th classes. The author here concentrates especially on the 11th class, where problems with indentification are encountered on a higher, more abstract level. He also analyses the criteria which are important in the preparation of excercises for the 11th class.

instruction + biology, instruction methods, work with books, identification keys - 147309.

9.7 Methods of observation

248. ALTMANN, A.:
Plazi. Pozorávní, pokusy a zajímavosti k učivu 6. ročníku základní školy (Reptiles. Observations, experiments and interesting facts on the subject-matter taught in the 6th class of basic school.)
Přírodní vědy ve škole, 33, 1981-1982, No. 2, pp. 46-47.

According to the teaching syllabus, basic observations and experiments concerning the topic Reptiles in the zoology course of the 6th class of basic school should be carried out with the aid of mounted natural objects, pictures and slides, on the basis of which both the internal and external characteristics of reptile body structure are studied. The teaching syllabus also recommends that the most valuable and important observations take place in the course of laboratory work, in living nature sections of biology classrooms, in zoos or exhibitions of aquariums and terrariums, during visits to museums and during excursions. The article points to the utilization of existing media such as films, slides, cassette films, transparencies, pictures and stresses the importance of forming zoological notions on the basis of analytical and synthesizing logical procedures; it also provides instructions concerning zoo and logical techniques used for the collection, killing and mounting of reptiles. Instructions for observations include observations of molting, the structure ofa reptile's skeleton, the determination of a reptile's eyesight, thermotaxis, phototaxis, photofobia, thermophily, the static position of the head and its turning reflexes, an experiment with the evaporation of water from the surface of the reptile's body, an experiment to prove hearing in reptiles, their tactility, observations of feeding, determining theromotaxis in reptiles. In conclusion the author cites various interesting facts about reptiles, concerning the length and weight of their bodies.

instruction + biology, basic school, 6th class, repriles, observations, experiments, instruction methods - 147309.

249. ALTMANN, A.:

Pozorujte své oční pozadí (You can observe the fundus of your eye)

Přírodní vědy ve škole, 33, 1982, No. 5, p. 172.

For a physician an examination of the eye fundus is very important. A physician uses an ophthalmoscope,

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but first he must dilate the pupil with atropine or homatropine. In biology lessons in basic school or in general education secondary school practical excercise can be carried out where pupils examine their own eye fundus. A black piece of board is used in which a small hole is made which is applied to the eye; the board must be pressed to the cheek and nose. Rotational movements are carried out while the other eye is shut tight. In several seconds the person sees his own eye fundus. The author provides its description.

instruction + human biology, observations, sensory organs + sight - 147309.

250. ARNOLD, M.R. - LYONS, M.B.:
Laboratory Investigation Using the Anthracnose Disease of Beans
The American Biology Teacher, 44, 1982, No. 1, pp. 51-55. 5 figs.

The Anthracnose disease of beans is a plant disease whose development is suitable for observations. The author describes its progress from the beginning of the infection up to the maturity of the fungus; this can be combined with various microscopy excercises and experiments. All that is required are several mineral solutions, glass laboratory implements and of course a microscope. The detailed description in the article will help both teachers and students to carry out this interesting experiment.

instruction + biology, instruction methods, observations + microscopy, experiment - 147309.

251. BAUGH, T.M.:
Damsels, Dragons, Wet-Footed Insects
The Science Teacher, 49, 1982, No. 1, pp. 34-36. 7 figs.

The slow development of water insects, which take 2 years to achieve maturity, is here described by a biologist from the Yellowstone National Park. He describes the life cycle of water insects, their behaviour in various situations and the eco-system in which they live. Information is also provided on the life cycle of the mosquito and the enemies of water insects . Water insects are easy to collect and to observe in the laboratory where they will multiply if they have proper conditions for life. The project described is very interesting.

instruction + zoology, observations, insects + water, instruction methods - 147309.

252. DITTRICH, P.:
Funktion und Physiologie der Spaltöffnungen (The function and physiology of stomata)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 3, pp. 65-74. 11 figs., lit. 5.

Gaseous exchange in leaves takes place through stomata, surrounded by crecent-shaped epidermal guard-cells . Each stoma or pore is surrounded by two guard-cells. Through them the leaf emits water vapours, CO_2 and oxygen into the environment and intakes these gases from the environment, depending on external atmospheric conditions. The author describes the incidence, structure and function of the guard-cells and stomata for plants in general and especially analyses their role in water regulation, as well as the role of light, CO_2 and plant hormones. In conclusion he provides instructions for school observations and experiments with plants within the framework of the plant physiology course.

instruction + biology, physiology + plants, observation, experiments, cover tissue - 147309.

253. GOTTSCHALK, R.:
Behandlung des Phänomens der Induktion am Beispiel der Horn- und Geweihentwicklung heimischen Säuger in einem Leistungskurs II. (Dealing with the phenomenon of induction on the basis of the example of the development of horns and antlers of domestic cattle in the upper classes of secondary school.Part II.)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 12, pp. 373-380. 4 appendixes.

The continuation of an article which deals with experiments and observations of the development of horns and antlers in domestic cattle and other animals. Experiments concern the transplantation of the skin which covers the base of the antlers to the haunches and vice versa, an experiment with extending the skin of the antler base in the direction of the centre of the forehead and an experiment with the transplantation of the periosteum of various antlers to the bones of the front legs. Pupils are asked to outline an experiment which would explain the hormonal influence on the primary creation of antlers. Similar assignments can be given for school-leaving examinations - for instance a transplantation on domestic cattle of skin from the place where horns develop to the back of the animal. Pupils work independently and the work has the characteristics of scientific research.

instruction + zoology, secondary school, instruction methods, observations, experiments - 147309.

254. GOTTSCHALK, R.:

Das aktuelle Unterricht, Behandlung des Phänomens der Induktion am Beispiel der Horn- und Geweihentwicklung heimischer Säuger in einem Leistungskurs (A current teaching topic: Dealing with the phenomenon of induction on the basis of the example of the development of horns and antlers of domestic cattle in the upper classes of secondary school - part I.)

Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 11, pp. 341-350. Lit. 22, 11 figs. 3 patterns for transparencies, 1 workscheet.

On the basis of the example of the development of horns and antlers pupils can become acquainted with the functioning of induction in development processes. Such assignments can be given to pupils of the upper classes of secondary school for their independent work and as preparation for study at an institution of higher learning. The anatomy of the heads of the Bovidae and Cervidae are described in detail, histological microscopy studies are done, as well as physiological experiments; on the basis of their interpretation and induction, the development of horns and antlers is explained.

instruction + zoology, observations, instruction methods, experiments + physiology, secondary school - 147309.

260. GOULD, S.:

Why the Apple Turns Brown

The Amrican Science Teacher, 49, 1982, No. 1, pp. 26-27. 1 fig.

The pulp of apples exposed to air quickly browns. The same happens to lettuce, mushrooms and fresh potatoes. The author describes the chemical changes which occur and the processes which cause changes in the colour of freshly cut fruit. His point of departure is the cell and he explains the course of enzymatic browning, which also effects quality, including nutritious value, taste, appearance and the smell of the fruit. He also describes methods for observing changes in the chemical structure of the fruit, including many details. The experiment is suitable for the upper classes of secondary school.

instruction + biology, secondary school, instruction method, observation, experiment, botany - 147309.

256. HÖNER, P. - DIRCKSEN, R.:
Wir beobachten Vögel im Wattenmeer (Bird observation in the mud flats)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 5, pp.181-186. 6 figs., 2 worksheets.

The birds found in the mud flats of Northern Germany and on the nearby islands are varied and numerous. The article serves as instruction for those going on an excursion to the mud flats. The author describes the food which the mud flats and the salty meadows on the coast provide for birds and the opportunity for nest building which the area offers. More attention is devoted to the sea gull, tern and ducks. The author describes how they can be observed and studied.
The 5 most numerous species each have a brief monograph devoted to them. The worksheets and information in the article include a total of 19 bird species. Besides instructions for organizing the excursion the author also offers comments on some problems connected with bird ethology.

instruction + zoology, instruction methods, observations, excursions, sea - 147309.

257. JEFFRIES, P.:
Microscopy of Living Terrestrial and Aquatic Microorganisms: A Simple Technique Using Flat Glass Cappilaries
Journal of Biological Education, 16, 1982, No. 1, pp. 35-38, 14 figs., 1 tab.

The direct observation of microorganisms in their own environment is quite difficult. The author describes a tested method which uses flat angular cappilaries which can be placed in various localities in a natural aquatic environment or struck into the soil to various depths. After some time the cappilaries are taken out and immediately transfered under a microscope. The microorganisms are thus observed almost in their own environment, i.e. in drops of water of bits of soil which were on the glass. The examples cited of the microscopy specimens thus obtained indicate that this method can achieve very favourable results.

instruction + biology, microscopy + technique, microorganisms, observations - 147309.

258. KRONFELDER, M.:
Holzbewohnende Pilze unter besonderer Brücksichtigung der Porlinge (Fungi growing on wood, with special stress on bracket fungi. A teaching topic)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 4, pp. 117-122. 7 figs., lit. 16

Wood rotting fungi, especially bracket fungi can serve as a suitable object for a number of interesting observations during nature excursions. Bracket fungi are parasites specialized for specific substrates (species of trees). The author describes assignments for the observation of the succession of wood rotting fungi, how a tree is infected by the spores of brackets, the development of their fruiting body, their geotropism, the zonality of the fruiting body during the year and how trees protect themselves against wood rotting fungi. The author cites specific instructions for observations and provides pictures, tables and worksheets. The objective of teaching this topic is learning about the conditions for the germination of spores of fungi on wood, as well as the biology of wood rotting fungi, its nutrition, succession and physiological specific aspects.

instruction + botany, fungi, parasitism, instruction methods, observations, excursions - 147309.

259. LAMB, W.G.:
Is the Moon Really Larger on the Horizon ?
The Science Teacher, 49, 1982, No. 2, pp. 46-48. 2 figs.

If an optical illusion is not disproven in a specific manner, it is often considered to be reality. The author asked his students about the size of the moon in various positions on the horizon and led them to carry our specific calculations to prove that their estimates of the moon's size greatly fluctuated. The author also suggests taking photographs under specific conditions, which is inexpensive and can be done by older basic school students or those in secondary school.

instruction method, observation, experiment - 147309.

260. NEDVÍDEK, J. - HABROVÁ, V.:
Využití akvarijních ryb ve výuce zoologie (The use of aquarium fish in zoology instruction)
Přírodní vědy ve škole, 33, 1981-1982, No. 4, pp. 131-133.
5 figs.

Aquarium fish can be used as a suitable object for a number of observations and experiments, for instance the observation of blood circulation and blood cells, bone cells in flat bones, pigment cells in the skin, scales, skeletal muscles, as well as the movement of fish connected with respiration and the structural and functional characteristics of a fish's body. The author provides instructions for observing heart and blood circulation, for anaesthesizing fish, making blood smears, etc.

instruction + zoology, instruction methods, observations, fish + acquarium, observation + microscope - 147309.

261. PEDRYC-WRONA, M.:
Stosowanie metody obserwacji v procesie nauczania i uczenia sie biologii (Using observations as an instruction method in the teaching and learning of biology)
Biologia w szkole, 35, 1982, No. 1, pp. 25-26.
Lit. 5, tab. 2.

Observations as a method of instruction are prefered by a number of specialists in the didactics of biology, such as Altmann, Dietrich, Kupisiewicz, Michalow, Stawinski and others. The use of an original object guarantees fuller cognition, more permanent knowledge and the acquisition of necessary skills. Observations are especially important in the lower classes so that biological notions are formed. The author

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provides information on the outcome of the testing of a hypothesis, according to which when an original object is observed as a teaching method, the outcome of instruction is better. The experiment was carried out, in accord with the requirements of didactics, in experimental groups of pupils and control groups. The findings are very interesting and fully confirmed the hypothesis. Work with an original object and observations as an instruction method are especially important for the permanency of the knowledge acquired by pupils. The experimental classes had an average of 27.4 % better results than the control class, where instruction was carried out only in a traditional method of exposition and discussion.

instruction + biology, instruction methods, observations, original object, research project - 147309.

262. PHILLIPS, G.S.:
Crayfish in the Classroom: A New Look At Some Old Friends
The American Biology Teacher, 44, 1982, No. 2, pp. 121-127. 5 figs.

The crayfish is an interesting animal, which is very well suited for studying reproductive behaviour. It has an important role to play in the ecology of aquatic environments and deserves greater attention on the part of biology teachers and their students. The author discusses the use of crayfish as material for school projects and laboratory work. He describes how the sex of crayfish can be distinguished, their reproduction and life cycle and how they behave in the laboratory. His instructions are very detailed and will satisfy all biology teachers, who decide to breed crayfish for school observations and experiments.

instruction + biology, original objects, observations, experiments, instruction methods, crustaceans - 147309.

263. READBURN, H.:
Using Dwarf Cichlids in Secondary School Biology
The School Science Review, 64, 1982, No. 227, pp. 270-272, 2 figs.

The value of some cichlids for studying fish ethology in secondary schools has only recently be acknowledged. Especially the small dwarf species of cichlids have traits which are especially favourable for long-term observations. They form permanent pairs and show a great deal of maternal care. Besides this they take care of their territory, they are sexually dimorphous and intensively coloured, they hide their females, etc. The author describes how to adjust an aquarium for their breeding; otherwise keeping them is fairly simple.

instruction + biology, original object, instruction methods, observations, ethology, fish, aquarium - 147309.

264. RICKEN, W.:
Diffusion und Osmose - durch teilchenmässige Betrachtung leichter verständlich (Diffusion and osmosis are easier to understand on the basis of observing particles)
Biologie in der Schule, 31, 1982, No. 9, pp. 358-359. 1 fig.

Before pupils in the 9th grade understand diffusion and osmosis they learn about how roots intake water. When explaining how water from the soil enters the root cappilaries it is best to make use of knowledge gained previously in physics. Diffusion can be explained on the basis of mixing sirup and water and the same is true of osmosis. The author uses two pictures to explain both processes.

instruction + general biology, diffusion, osmosis, observations, experiments, instruction method - 147309.

265. RUSSO, R.:
Astronomy by Day
The Science Teacher, 49, 1982, No. 3, pp. 54-55.
2 figs.

Observation of the night sky in large groups of students presents certain difficulties and takes up a lot of time if all students are to take turn looking into a telescope. On the other hand observations of the sun in the daytime are very attractive, even if they require maintaining some safety rules (the eyes). The author describes such observations at various times of the day, with the aid of a small astronomy telescope. An advantage is that the sun is not observed directly but is reflected on a screen, so that larger numbers of students can participate in the observation at one time. The author indicates an observation program, which will arouse the interest even of those students who otherwise do not like science.

astronomy, the sun, observations - 147309.

266. SEDNEV, N.E.
Kak mi provodim fenologicheskiye nablyudeniya
(How we carry out phenological observations)
Biologiya v shkole, 56, 1982, No. 2, pp. 59-60.

The basis for phenological observations are the biology teaching syllabi used in the 5th to 7th classes, as well as the instructions issued by the Committee for Geography Instruction of the Geographical Society of the USSR. The author here provides information on how he organizes phenological observations, what the pupils observe and how they record their observations. Twice a week they report on their observations and about new events taking place in nature. Each month a bulletin board is made. At the same time the tasks for the forthcoming month are set. Frequent excursion are organized, one to winter nature, 2 to 3 during the spring and autumn and 1 to 2 during the summer months. One excursion should be a model one where the teacher explains to pupils how phenological observations should be carried out outdoors. Pupils can collect material for exhibitions in school. Phenological observations can also be continued in the 8th class, or up to the 10th class. In the upper classes phenological excursions should be combined with excursions to learn about the nature of the pupils' native region. Work in a phenological hobby club helps to extend knowledge concerning the nature of the region.

phenology, observations - 147909.

267. SCHRÖDER, F.:

Die Strömung als dominierender Faktor im Fliessgewässer

(Currents as the dominating factor in flowing waters)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 10, pp. 293-299. Lit. 10. 8 figs., 2 patterns for transparencies.

The author here deals with the ecology of flowing waters. He analyses the influence of currents on aquatic organisms. In a biota of flowing water intensive metabolic processes take place between free water and the zone of contact with the soil; the substrate of the soil disintegrates, the rapid physiological renewal of the water around animals occurs, flowing waters carry food with them. A biota of flowing water can be used to demonstrate a flowing equilibrium. Organisms living in flowing water are in constant danger of being carried away. As a consequence they have developed interesting adaptation mechanisms to stay in the current. Algae hold on with special discs or cells which catch on to the uneven surface of the substrate. Usually they survive in marginal areas of the current or in its "shadow". Many insect larvae have developed a daily period for various activities so that the hydraulic stress on their body is decreased; for instance during the day they are hidden under stones, and at night-time they climb up on stones where they feed on the algae. The darkness protects them from predacious fish. Insects are also adapted to flowing waters by their flat bodies. The hydropsyche larvae in currents have their bodies covered with heavier anorganic material than those hydropsyche which live in stagnant waters or in water that flows slowly. Other animals have developed other organs to protect them against the current (various hooks, sucking cups, etc). Insects lay eggs upstream and often larvae travel against the current, otherwise the upper parts of streams would be without life. The technique of feeding by these animals is very interesting: some of them filter water in a passive manner and retain small particles found in the water, while others do so actively. The larvae of the black fly are especially well adapted to living in a strong current.

insects, aquatic enviroment, ecology - 147309.

268. ZIPKO, S.J.:
Badkin Behaviour of Painted Turtles
The American Biology Teacher, 44, 1982, No. 7, pp. 406--412. 6 figs.

The behaviour of turtles has never been studied carefully, in spite of the fact that turtles are very interesting from this point of view. The author describes laboratory experiments with three specimens of the Chysemis picta picta turtle, where the sun as a source of heat and light is replaced with lamps. When "sunbathing", the turtles achieve the most unexpected positions, which the author photographed. He also took their body temperature when sunbathing and when resting in the shade; this data is recorded in the form of a diagram. These experiments can be done in any school; The turtles can be bought.

instruction + biology, Instruction methods, observations, experiment, reptiles, turtles - 147309.

9.8 Experimental methods

269. BÄDDLER, U.:
Neurophysiologische Experimente in der Schule
(Neurophysiological experiments in school)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 9, pp. 257-258.

The author stresses the importance of experiments in neurophysiology, especially electrophysiology, and knowledge in neural anatomy. Such problems can be dealt with in the upper classes of secondary school. The teaching syllabi used in all regions of the FRG require that students in the upper classes of secondary school master the methods and approaches used by a specific science. In the natural sciences this requires the mastering of experimental techniques in the course of student experiments. Experiments in molecular biology are limited to simple proof of the presence of various substances, while in ethology a description of stereotypes in behavioural patterns. In some areas of biology, experiments are very easy and many can be done. The author discusses the possibility of decreasing the number of lessons available for biology topics which do not include experiments and increasing the number of lessons devoted to those topics which require experiments. In this context the author discusses experiments in neurophysiology in the 10th class. They require the availability of oscillators, amplifiers and micromanipulators, which are all costly. Some suggestions for less expensive apparatus are made.

instruction + biology, instruction methods, experiments, neurophysiology - 147309.

270. BENNET, R. - HAMILTON, M.:
The Use of Techniques of Sensory Evaluation as a Framework for Teaching Experimental Methods
Journal of Biological Education, 15, 1982, No. 4, pp. 266-269. 2 figs., 5 tabs.

The evaluation of goods only through sensory techniques is widely used, especially in the food processing industry. The authors here describe a method of using this simple assessment method in school with the aim of teaching students testing methods. They cite specific examples with potatoes, called the "triangle test". Salted potatoes, unsalted potatoes and salt washed potatoes are tested. Students test them individually and record their taste assessment according to a given code. Usually groups of 12 students do the test, independently of each other. The test can be done anywhere in a laboratory or in the school kitchen. A detailed instruction for the experiment is provided, as well as methods of assessing findings.

instruction + biology, instruction methods, experiments - 147309.

271. BINAS, A.V.:

Metodika opitov po izucheniyu gazobmena pri fotosynteze

(The methodology of experiments to study gas metabolism in photosynthesis)

Biologiya v shkole, 56, 1982, No. 6, pp. 36-41, 6 figs.

The teaching syllabus for the 5th class botany course requires a demonstration which shows the production of oxygen and the intake of CO_2 in the course of photosynthesis. It seems, however, that all the experiments recommended in the literature have some shortcomings. Not one of them determines experimentally the intake of CO_2 by leaves in the course of creating starch. The output of oxygen when exposed to light is usually demonstrated by experiments with water plants (Elodea), but these experiments do not show the creation of starch in leaves and thus the connection between both processes is not shown. The author therefore recommends experiments with terrestrial plants and with leaves alone, with branches and with potted plants. The series of experiments recommended demonstrate not only the output of oxygen, the intake of carbon dioxide, but also the creation of starch in the leaves. The experiments are easy to carry out within the framework of a teaching lesson.

instruction + botany, plant physiology, instruction methods, experiments - 147309.

272. BRUNNER, U.:
Boden, Dünger und Wachstum (The soil, fertilizers and growth - simple school experiments)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 4, pp. 139-140.

The article describes simple experiments which show the relation between a plant and its environment in the soil, as well as the fertilizers used. Pupils use summer rye which they cultivate in peat, in peat with ash, in a mixture of peat, ash and manure, in soil with manure, in a water medium with ash, in water medium with complete solid fertilizer and in a water medium with complete liquid fertilizer. The results are compared and findings commented.

instruction + biology, soil, plant, fertilizers, instruction methods, experiments - 147309.

273. BRYCE, C.F.A.:
Rapid Nucleic Acid Sequencing Method Approaches to Facilitating Learning
Journal of biological Education, 16, 1982, No. 4, pp. 275-279. 1 tab.

DNA and RNA are part of the cell nucleus, of its chromosomal matter.The author in this article describes methods of isolating both nucleic acids from the cell nucleus. The methods are summed up in a table, including a summary of the experimental process. An assessment of the experiment requires computer processing according to cited methods. This procedure has the advantage of combining theory and practice, in comparison to the use of mere models of nucleic acids.

instruction + general biology, instruction method, experiment, cellular nucleus - 147309.

274. CLAUSITZER, H.J.:
Die Gelbrandkäferlarve - ein interessanter Bewohner von Kleingewässern (The larvae of the predaceous diving beetle - an interesting inhabitant of small water areas)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 4, pp. 122-127. 2 figs., 2 worksheets, lit. 11.

Land reclamation and drainage of small pools and ponds has also led to the gradual disappearance of a number of plants and animals. One of the most frequent inhabitants of small pools and ponds are diving beetles and their larvae, which are the most frequently found larvae in these areas. The author describes possibilities of comparing them with other insects and carrying out various experiments with them. He provides instructions for their collection and keeping them in an acquarium. Observations and experiments concern light reflexes, the orientation of the larva towards light with its back, their feeding, extracorpuscular digestion, as well as experiments with dummy prey. Also the insect's place in the food chain and food network are discussed.

instruction + zoology, instruction methods, observations, experiments, insects + water - 147309.

275. COUILLARD, D.:
Dancing Mothballs - Safe Partners ?
The Science Teacher, 49, 1982, No. 5, pp. 26-30.
3 figs., 1 tab.

Mothballs can be used for a number of experiments, which the author describes. Because these are inexpensive experiments they are very frequently done in school laboratories and usually the health hazard they pose both for teachers and students is overlooked. The author analyses all risk factors connected with this chemical when it is used indiscriminately and without taking certain precautions. Usually this chemical is considered to be harmless, but the author cites facts which indicate the opposite. Its vapours can be dangerous, especially to those suffering from congenital disease. In conclusion instructions are provided on how to deal with this problem.

didactical principle + biology instruction, work safety, experiment, chemicals - 147309.

276. DORST, F.W.:
Mehr CO_2 in angehaltener Luft ? (More carbon dioxide in held breath ?)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 10, p. 369.

The author describes an experiment which proves that air exhaled from the lungs after holding one's breath contains more carbone dioxide than normally exhaled air. The experiment should be repeated five times. It is more proof-worthy when limewater in a test tube is used instead of baryta water.

instruction + human biology, respiration, carbon dioxide, experiment - 147309.

277. EWALD, K.:
Vom Ei zum Küken - der Einsatz einer Kunstglucke im Biologieunterricht (From an egg to a chick - the use of a hen battery in biology instruction)
Der Biologieunterricht, 18, 1982, No. 1, pp. 4-31.
9 photos, 7 worksheets.

Independent observations and experiments with animals are very important in biology instruction. The article describes opportunities for breeding chickens from eggs, in school hen battery and carrying out observations of the development of the chicken embryo from the 4th to the 18th day. This requires an incubator - the author recommends small units which are commercially available in the FRG and also artificial hens which game-keepers use, which are cheaper and can also be used in the study of ethology; they are also very durable, are easy to use in a classroom and makes it possible to visually and acustically study the development of the chick. The author also recommends the use of films and slide series. A chicken egg normally requires 21 days for development, while pheasant eggs require 22 to 24 days, ducks 28 days and geese 30 to 32 days. The best time for these observations are February to June. During the first lesson the experiment is started and by the 3rd day the heart pulse can be seen. In the next lesson the problem of how the embryo is supplied with nutrition is dealt with. In the 3rd lesson a protocol of the experiment is written and during the 4th and 5th lessons an excursion to a chicken farm is organized. The author provides detailed instruction for the whole experiment and observation tasks from the 1st to the 21st day.

instruction + zoology, instruction methods, experiment, observation, birds, embryo development - 147309.

278. GILL, J.:
A Study of Germination Inhibition in Fruit
Journal of Biological Education, 16, 1982, No. 3,
pp. 162-163. 3 figs.

The author describes a method which has been developed in the course of several years and which demonstrates quantitative and qualitative differences in germination inhibitors in various fruit and the presence of several inhibitors in a single fruit. The method includes a procedure for isolating the inhibitors and the techniques used in biological testing. The example of germination in an orange extract and a tomato extract are described as examples. This method makes it possible to explain the essence of germination and the effect of various inhibitors under various conditions. The method is not expensive, does not require extensive experience and can be done with the usual school equipment. It is suitable for pupils from 17 to 19 years of age.

instruction + biology, plant physiology, germination, inhibition, instruction method, experiment - 147309.

279. GLASS, A.D.M. - SIDDIQUI, M.Y.:

Potassioum-hydrogen Ion Exchange Across Barley Roots: An Introduction to Chemiosomotic Principles of Solute Transport

Journal of Biological Education, 15, 1982, No. 4, pp. 289-293. 3 figs.

The authors describe the chemiosmotic theory of ATP synthesis and solute transport through membranes. On the basis of a simple experiment, which can easily be done in a school laboratory, they describe the measurement of H^+ transport and the auxilliary flow of cations through the corticular cells of roots of barley plants which have not been damaged. In view of the simplicity of the experiment the teacher can make a number of alternative variations, according to the needs of his course. A simple instrument, which can be made in the school workshop and whose drawing is attached, should be used for measurements.

instruction + biology, plant physiology, experiment - 147309.

280. GLÄSER, H. - BUSCHOFF, H.:
Einige Erfahrungen bei der Durchführung der Lehrplanexperimente in Klasse 12 (Some experiences with carrying out experiments according to the teaching syllabus for the 12th class)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 291-292.
1 fig.

The authors provide instructions for three selected experiments which have been tested and found to be interesting in the course of preparing the new model of instruction. The first proves the forming of oxygen in the course of photosynthesis with a pyrogallol solution, the second proves the presence of hydrogen during photolysis of water with potassium hexacyanoferrate and iron trichloride. The third concentrates on measuring the consumption of oxygen in the respiration of invertebrate animals.

instruction + biology, plant physiology, animal physiology, photosynthesis, respiration, experiment - 147309.

281. GÜRLICH, F. - SCHULTE, H.:
Photosynthese und Sauerstoffnachweis - Erfahrungen mit der Indigo-Methode (Photosynthesis and proof of oxygen - experiences with the indigo method)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 10, pp. 314-319. 1 pattern for transparency.

Proof of the presence of oxygen in the course of photosynthesis with the aid of indigo can yield the following finding : Work with terrestrial plants yields the same result as with aquatic plants (waterweed). The indigo method makes possible the reduction of a solution of indigo-carmine with solid in place of liquid Nadithionite (the apparatus must have ground-in stoppers). The best source of carbon dioxide is $KHCO_3$. Mineral water is not suitable for the experiment. The indigo method is described in detail and possibilities for its use in school instruction are described in detail. Another experiment uses this method while at the same time applying a herbacide. The author describes suitable material for the experiment and its preparation and execution.

instruction + biology, plant physiology, photosynthesis, experiment - 147309.

282. HÄFKER, R.:

Messung des CO_2 Gaswechsels grüner Pflanzen im Schülerversuch (Measuring the carbon dioxide metabolism of green plants in pupil experiments)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 4, pp. 238-239.

The author continues in the subject-matter of an article in this journal (34, 1981, No. 2), in which he dealt with the quantitative determination of carbon dioxide and the gas metabolism of green plants. Here he demonstrates another alternative of this experiment suitable for pupil experiments. The experiment can be carried out on a parallel basis, so that a number of pupils participate, without too great demands upon the equipment available in the school. The experiment is based on the diffusion equilibrium between 1000/m of $NaHCO_3$ solution and the surrounding atmosphere. The solution under normal air should have pH 8.2 which is in accord with a concentration of 300 ppm CO_2. The solution should be in a stopped-up test tube and should not come into contact with the sun flower or beet leaf which is the object of the experiment.

instruction + biology, plant physiology, photosynthesis experiment - 147309.

283. HUNDT, R.:
Ein Demonstrationsversuch zur Verdrängung von Pflanzenarten aus ihren physiologischen Optimum durch Konkurenz (A demonstration experiment on the displacement of plant species from their physiological optimum, by competition)
Biologie in der Schule, 31, 1982, No. 2-3, pp. 90-98. 8 figs., 4 tabs.

Within the topic Ecology in the 11th class the teaching syllabus assumes a demonstration experiment which will show displacement of a weak specie by a stronger one on the basis of competition. Suitable species for this experiment are the kidney bean and yellow lupine. The objective is to study competition between both species in soil with different pH values. The author describes in detail the formulation of the objective, the material and apparatus required and how the experiment should be carried out and assessed.

instruction + biology, plant physiology, experiment - 147309.

284. KÖLSCH, A. - STORRER, J. - CRUSE, H.:
Einrichtung eines elektrophysiologischen Arbeitsplatzes für Schulversuche (Creating a workplace for electrophysiological experiments in schools)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 9, pp. 258-261, Lit. 3, fig. 5.

The author describes the apparatus needed to carry out electrophysiological experiments in school and how the electrodes of a micro-manipulation apparatus and an inexpensive differential amplifier can be built. On the basis of these instructions the teacher can make these instruments himself, with very little money. Electrophysiological experiments are always somewhat more demanding and require more time. For these reasons sufficient attention should be paid to the equipment available. Modern instruction cannot overlook this very important section. The author also describes experiments with humans or with insects.

instruction + biology, animal physiology, media + biology instruction, experiments - 147309.

285. LEVITSKIY, P.M.:
Opiti dokazivayushchiye vred tabachnogo dima i alkogolya
(Experiments which demonstrate the negative effects of tobacco smoke and alcohol)
Biologiya v shkole, 56, 1982, No. 5, pp. 48-52. 1 fig.

The author provides instructions for seven experiments, which demonstrate the negative effects of tobacco smoke and alcohol. For each experiment, its objective is described, as well as a list of aids which are required, its course and findings. The article concerns the following experiment: proving the presence of acids, tar and nicotine in tobacco smoke, proving the high carbon dioxide content in tobacco smoke, the deposits on the lungs formed by tobacco smoke, the negative effect of tobacco smoke on the blood, the negative effect of alcohol on blood, the breakdown of protein under the influence of alcohol, the negative effect of alcohol on the digestive tract.

instruction + human biology, alcoholism, smoking, experiments - 147309.

286. LIPPOLD, P.:
Ein einfaches Demostrationsexperiment zum Nachweis des Transpirationssogs (A simple demonstration experiment to show a transpiration flow)
Biologie in der Schule, 31, 1982, No. 9, p. 360. 1 fig.

The teaching syllabus for the 9th class requires the teaching of the topic Transpiration. Instruction can be supplemented with an experiment, which is here described in detail. A yew tree branch or a cypress branch is placed into a 50 cm long glass tube which is then placed into a small vat filled with water and carbon tetrachloride, with several crystals of iodine added to provide the solution with colour. First the liquid is drawn into the tube by mouth and then the branch is fitted into the other end of the tube, while the free end is submerged into to vat with the solution. After already five minutes the outcome of transpiration can be observed - during one hour the coloured solution will rise in the tube to a height of 15 to 20 cm.

instruction + botany, plant physiology, transpiration, experiment - 147309.

287. MENSING, B. - KLAUTKE, S.:
Versuche zur Verdauung beim Menschen (Experiments concerning human digestion)
Der Biologieunterricht, 18, 1982, No. 4, pp. 62-68. Lit. 9.

The author here offers several experiments concerning the topic human digestion, which have been didactically tested and found effective. They include the following: the breakdown of sugars by saliva (ptyaline), the transformation of starch into sugar, the digestion of proteins in an egg white, the digestion of protein flakes by pepsine and pancreatine, the emulgation of fats by gall, the breakdown of fats by pancreatic enzymes and the dissolution of fats by pancreatine in a fatty acid and in glycerine.

instruction + human biology, physiology, digestion - 147309.

288. NAYDENOVA, L.:
Razbitie na poznavatelnite sposobnosti na uchenitsite ot nachalnite klasove pri zapoznavanate im s prirodata
(Developing the cognitive abilities of pupils by acquainting them with nature beginning with the lowest classes of school)
Biologiya i khimiya, 25, 1982, No. 4, pp. 40-46.

The reform of the school system in 1973 introduced a new teaching subject into the 1st to 3rd classes, called Knowledge of the Motherland. This provides teachers with the opportunity to guide pupils towards learning about nature and society. The new teaching syllabus for the 1st and 2nd class now contains the topic "Our native region", which deals with both natural and social aspects of the local region. In the 3rd class this knowledge is differentiated into independent teaching-subjects - the natural sciences and civics.

The teaching of all three of these teaching subjects is interconnected with a system of observations of natural objects and phenomena and with experiments with various natural objects. Pupils observe various seasons, changes which occur in the life of plants and animals, specific aspects of the anatomy of various plants and animals, changes in the work which farmers do based on changes in the season. To achieve a greater observation effect it is necessary to do simple experiments; for this purpose teachers should be well acquainted with the notions that their pupils have and which can then be further developed. The lower the class which a teacher teaches, the greater attention should be given to various teaching aids. Observations can be induced by giving correctly chosen question. On the basis of selected topics the author demonstrates how elements of dialectics and logic can be introduced into the cognitive activities of pupils.

instruction + natural sciences, instruction method, observations, experiments - 147309.

289. OBWANDER, J. - BINNBECK, S.:
Entwicklung und Balzverhalten beim Seidenspinner (Bombyx mori und Bombyx mandarina). Einfache Versuche zum Ethologieunterricht in der Sekundarstufe II.
(The development and behaviour of the silkworm (Bombyx mori and Bombyx mandarina) in courtship. Simple experiments in ethology teaching in the upper classes of secondary school)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 5, pp. 154-157. Lit. 6, 3 figs.

Butterflies are very good objects for observations of the development of insects and also for a study of pheronomes. On the basis of the silkworm (Bombyx mori) and its wild form (Bombyx mori mandarina) it is possible to carry out very interesting observations and experiments, including those on pheromones, with very modest means. The article also contains instructions for keeping the silkworms, how to observe the various stages of their development and how to carry out experiments with bombykol, which is the pheromone produced by the female. Males react to bombykol even when it is diluted at a ratio of 1000 molecules of bombykol in 10^{19} molecules of gas in 1 cm^3 of air. The males

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will fly to the source of the bombykol (even if it is a dummy) with strong movements of the wings, run around the female and will attempt to copulate. Observations and experiments with the silkworm are suitable for the 7th class and in a more complex form for the upper classes of general education secondary schools.

instruction + ethology, secondary school, butterflies, pheronomes, observations, experiments - 147309.

290. POENICKE, H.W.:
Schwarser Papier kann heller sein als weisses !
(Black-paper can have a lighter colour than white paper !)
Naturwissenschaften im Unterricht " Biologie, 30, 1982, No. 9, pp. 313-315. Lit. 4, 1 fig.

The subjective constancy of sight is based on the contrast effect and on the adaption of the eye to a medium intensity of light. The author describes interesting and attractive experiments and observations which show how strongly our subjective assessment of what is light and what is dark on an observed object can be influenced by contrast and adaption. This situation can be changed only on the basis of changing the contrast, in spite of the fact that assessments in individual cases of experiments and observations may be paradoxical.

instruction + human biology, sight, observation, experiment - 147309.

291. REUTER, G. - MORAVIETZ, H.:
Genetische Experimente (XVI.) Kopplung und Crossing-over in Versuchen mit Drosophila melanogaster
(Genetic experiments - XVI. Linkage and crossing-over in experiments with Drosophila melanogaster)
Biologie in der Schule, 31, 1982, No. 12, pp. 538-541. 2 tabs.

To demonstrate the linear patterns formed by genes and chromosomes in genetic linkage and crossing-over, experiments which analyse the herdity of X chromosomes are best suited. This journal has already dealt with the heredity of X chromosomes in the fruit fly (Drosophila melanogaster). The mutation of the X chromosome can easily be identified, for instance on the basis of eye colour, the deformation of cilia, short wings, yellow bodies and other characteristics. The authors provide a detailed study and instruction for these experiments and their analysis. In conclusion a time-table for the experiments is provided.

instruction + genetics, experiments - 147309.

292. RICE, D.R. - DUNLAP, W.P.:
Introducing to the Ways and Means of Scientific Inquiry
The Science Teacher, 49, 1982, No. 3, pp. 56-57, 1 fig.

Introducing the methods used in an inquiry is especially important in biology instruction. Each inquiry has specific stages and overlooking any of them leads to inadequate findings. The author demonstrates his method of dealing with these problems on the basis of the example of the topic Erosion and sediments. First an exposition takes place, then a discussion with students when questions arise. Experiments in the school laboratory follow, which lead to answers to question asked by the students and then to generalizations. The causes and consequences of erosion and sediments are summed up, as well as the whole inquiry.

instruction + biology, geology, erosion, observation, experiment - 147309.

293. ROBINSON, P.M. - PARKER, R.E.:
Sixth-Form Projects in Biology: A Case History
Journal of Biological Education, 15, 1982, No. 4, pp. 275-278. 2 figs., 2 tabs.

In the introduction the authors comment of the appropriateness of various biological experiments, especially as far as their ease or difficulty is concerned, as well as the contribution they make to students cognition, when they themselves chose the experiment they would like to do. The authors cite in detail an experiment chosen by a secondary school student in Northern Ireland: to study the effect of pungent smells produced by onions (Allium cepa) upon the germinating seeds of lettuce (Lactuca sativa). The authors deal with this experiment in detail from a methodological point of view and provide various comments; they prove for instance that the germination capacity of seeds exposed to the effect of pungent smells produced by onions decreases with the number of onion units they are exposed to. In the case of onions, the substance in question is called a phytocid.

instruction + biology, phytocid, experiments - 147309.

294. ROWLANDS, W.O.:

Investigation on the Effect of Ionic Changes in the External Medium on Crop and Gizzard Movements in Earthworms

The School Science Review, 14, 1982, No. 227,
pp. 286-287. 3 figs., 3 tabs.

The author describes an interesting experiment on the influence of ionic changes on the alimentary tract of the earthworm which has been taken out of its body and placed in a test tube in a Ranger experimental solution and hung into a vat with roomtemperature water. The vat is then rotated at the speed of 0.13 mm/sec and connected to a cymograph with records the movement on the walls of the alimentary tract. Instead of a Ringer solution the author also provides the recepies of other solutions suitable for this purpose. It is interesting to note that the alimentary tracts of various earthworms do not demontrate the same pattern of movement.

instruction + zoology, Oligochaeta, alimentary tract, experiment - 147309.

295. SCHOLZ, E.F.:

Versuchs- und Aufgabensammlung zu meeresbiologischen Themen im Bereich der Sekundarstufe I. (A collection of experiments and excercises in marine biology for the lower classes of general education secondary schools)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 7, pp. 242-248. 3 information sheets.

The main objective in this project is a study of marine water as an environment for living organisms and the consequences of the pollution of the seas. In situational instruction the pupils first become acquainted with various problems, and learn to deal with practical problems. They first carry out simple experiments, make a marine aquarium and then make comparisons between the environment in the open sea, on mud flats and in a marine acquarium. Also chemical experiments are done to show the presence of Na, K, Cl, Br, J, Ca, Mg, Phosphorus and SO_4 in sea water. Also the effect of various aggressive substances on sea fauna is studied, as well as the effect of other chemicals and detergents on the skin of fish and the breakdown of food chains and networks. Pupils carry out various experiments connected with feeding molluscs, with their water cleaning activity, etc., in which the marine aquarium is used. Models of the soil on the mud flats are made and pupils become acquainted with the most important representatives of marina fauna.

instruction + biology, environment, the sea, fauna, Aquarium + sea, water pollution, experiments - 147309.

296. SPOHR, P.:
Kukuřice setá - model pro školní pokusy z genetiky
(Cultivated maize - as a model for school genetics experiments)
Přírodní vědy ve škole, 33, 1982, 1981-1982, No. 7, pp. 246-247. 1 outline.

Cultivated maize or corn (Zea mays) is a suitable object for school genetics experiments. It is a unisexual plant which is pollinated by the wind and the outcome of cross-breeding can be asessed in the course a single year. The splitting of characteristics takes place in the 2nd year in every plant with fruit. Several ears of corn are sufficient to carry out statistical analyses of the F_2 generation. In maize it is possible to cross-breed strains whose seeds have different Mendelian characteristics. The experiments should be carried out on a school plot of land; an area of 1 x 2 square meters is sufficient. Strains which have wrinkled and yellow seed, wrinkled and blue seed, smooth and yellow seed, smooth and blue seed are all suitable for these experiments. The initial material must be genetically pure and purely homozygotic. Seeds will keep their germination capacity for several years. The author describes the cultivation and crossbreeding of maize and how the male flowers can be castrated. In generation F_2 castration is not necessary. The material obtained can then be used to simulate Mendel's conclusions and the formulation of his laws. These experiments are especially suitable for those schools which have a mandatory elective subject called the Foundations of Agricultural Experiments.

instruction + biology, genetics, experiments - 147309.

297. STOHRER, J. - BÄSSLER, U. - KÖLSCH, A.:
Neurophysiologische Versuche an Insekten und am Menschen
(Neurophysiological experiments on insects and humans)
Praxis der Naturwissenschaften - Biologie, 31, 1982,
No. 9, pp. 261-268. Lit. 7, figs. 12, 1 worksheet.

The authors describe electrophysiological experiments with insects or with a human being. The experiments are described in detail and possible errors and their source are extensively discussed. As far as experiments on humans are concerned, they deal with the topic sensory organs and nerves, taught in the upper classes of general education secondary school. The authors stress that all such experiments should never come into conflict with nature conservation. Also that students should know how to correctly use an oscillograph and an amplifier is stressed. The experiments use an electro-retinograph (ERG) for the study of compound eyes in insects. The best for this purpose is the grass-hopper on which also experiments concerning the muscle potential of its jumping leg can be measured. Another experiment concerns the nerve potential of the stick insect. For experiments concerning human neurophysiology there are experiments using an electromyogram (EMG) and an elektro-cardiogram (ECG).

instruction + general biology, neurophysiology, experiment, insect, man - 147309.

298. STORRER, J. - WEGNER, U.:
Neuroanatomische Grundlagen der motorischen Ansteuerung bei Insektenmuskeln (The neuro-anatomic foundations of the motorics of insect muscles)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 9, pp. 268-274. Lit. 4, 8 figs., 1 tab.

The authors demonstrate how the Indian stick insect can be used in experiments in which the insect's nervous system is stained with methylene blue, as well as a method which allows neuro-anatomical staining with cobalt. Individual ganglia and motor neurons then appear clearly. Thus besides the electrophysiological aspect, also the basic components of the motor muscle can be demonstrated. The use of methylene blue for staining demonstrates the structure of the central nervous system of insects, as well as the nerves of sensory organs and muscles; cobalt can be used to selectively stain motor neurons which form the nerves of individual muscles. In this way the position of nerve cells in the ganglion can be observed.

instruction + biology, physiology, insects, experiment - 147309.

299. STÖCKE, C.:
Ein einfacher Versuch zur Bestimmung des Emersons Effektes bei Elodea canadensis (A simple experiment to determine the Emerson effect in Elodea canadensis)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 8, pp. 490-493. Fig. 5, lit. 11.

The author describes an interesting experiment for the upper grades of general education secondary school in which the effect of photosynthesis increases when the plant is at the same time illuminated with shorwave and long-wave light, i.e. the utilisation of the so-called Emerson effect. To achieve an understanding of photosynthesis requires carrying out very specific experiments based on knowledge in bio-chemistry and ecology. This experiment was done with teacher-training students during biology practical excercises. The findings are presented by graphic and mathematical analysis and in tables.

instruction + botany, photosynthesis, experiment - 147309.

300. STROTKOETTER, E.:
Zur Infiltrationsmethode von Molisch - einfacher Nachweis und Versuche mit Blättern zur Funktion der Sapltöffnungen (On the Molisch infiltration method - simple experiments with leaves concerning the function of leaf stomata)
Der Biologieunterricht, 18, 1982, No. 1, pp. 79-95, 3 figs., 3 tabs., lit. 15.

70 years ago Molisch published a simple method for studing stomata. The underside of the leaf is

sprinkled with drops of ethanol (or alcohol for burning, petrol, benzol, xylol or terpentine oil); these substances penetrate open stomata and form a stain, which is visible under a strong light. In this way the position of the stomata can be determined and the number of stomata which are open determined. This method does not, however, provide precise answers, but it is useful for school experiments in the lower classes of general education secondary schools. The article also contains brief information on the structure and function of stomata, their observation when the leaf has wilted and the relation between stomata and transpiration.

instruction + botany, plant physiology, covering tissue
stoma - 147309.

301. SHARIGINA, I.S. - LOMAKINA, E.Y.:
Koleusi - udobniy obyekt dlya postanovki uchebnikh opitov (Coleus as a suitable object for school experiments)
Biologiya v shkole, 56, 1982, No. 2, pp. 56-57.
2 figs.

The well-known indoor plant Coleus, which belongs to the Lamniaceae, is a suitable object for cultivation in living nature rooms in schools; it also provides suitable material for various experiments in botany, as well as for hobby clubs and biological practical excercises. It is easily reproduced vegetatively, has nice decorative colouring (anthocyans) and forms multicoloured varieties. The authors provide descriptions and instructions for a number of experiments, for instance observing the intensity of forming of supplementary roots in Coelus cuts, a comparison of apical, medinal and basal cuts and the development of roots, the influence of mineral nutrients on the growth of rooted cuts in a water medium, observations of the intensity of growth of cuts in soil and in hydroponics, the influence of light on the forming of anthocyans in the leaves, observing the speed of phototropic reactions and experiments with stimulating growth with the aid of heteroauxine. These experiments can be done not only within the framework of botany instruction, but also in general biology, where this plant can be a suitable object for experiments with mutations, cytoplasmatic heredity, phenotypical variability, the speed of reactions to external stimulus, etc. The article also contains instructions for the successful cultivation of the plant. When properly fertilized and cared for, it is a highly decorative plant.

instruction + botany, indoor plant, observation, experiment - 147309.

302. SHASHLOV, T.I.:
Prakticheskoye znacheniye opitnicheskoy raboti uchashchikhsya (The practical significance of experimental work done by pupils)
Biologiya v shkole, 56, 1982, No. 1, pp. 64-66.

The author describes experimental work done by pupils in a secondary school in the town of Bukanovsk in the Volgograd region. Pupils here do complex experiments which may take several years. Only the pupils of lower classes do simple experiments, whose outcome is soon evident. The author cites specific examples of experiments done on the school plot of land and their comparison with results achieved in the local collective farm. In the majority of cases the outcome achieved on the school plot of land is better. In conclusion the author stresses that these experiments are highly significant not only from the point of view of teaching, but also for practical agriculture.

instruction + botany, school plot of land, experiments - 147309.

303. TEEST, J. - KLEIN, I.:
Einkeimblättrige und Zweikeimblättrige unter der Einwirkung von Rasenhedonal. Unterricht an Pflanzen im Biologieunterricht (Monocots and dicots and the effect of the herbicide Hedonal. Instructions on the use of plants in the biology course)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 6, pp. 224-228. Lit. 8.

Hedonal is a herbicide on the basis of growth substances, which damages dicots; if the procedure used in its application is correct, it will not damage monocots, such as grasses. The experiments can be done by pupils, who should first recieve information about the effects of herbicides, their significance and their method of application. In the experiments, plants in their natural environment should be used, or they can be transfered to the classroom and the chemical applied there. The damage done to plants can be determined in 8 days. An interpretation of the findings concerns the effect of Hedonal on dicots and on monocots. Hedonal is assimilated by the plants without local damage and then effects the plant as a whole. Hedonal contains growth substances of the auxine group which in low concentrations accelerate growth, but in higher concentrations slow growth down. The experiment should include concentrations of 10%, 1%, 0.1% and 0.001% and control plants to which the herbicide has not been applied. Pupils should describe changes in seeds, germinating plants and the plant as a whole. It is interesting to note that Sanseviere trifasciata is resistant to all the above cited concentrations and even after 60 days no damage to plant was observed. The greatest damage is done to the leaves, especially large leaves.

instruction + botany, stimulation + chemical substances, experiment - 147309.

304. THOMAS, K.R.:
The Enzymatic Bursting of Balloons
Journal of Biological Education, 16, 1982, No. 4,
pp. 226-228, 2 figs.

Enzymatic processes are very important in biology and are almost impossible to demonstrate experimentally in school. Also theoretical explanations are difficult to understand, especially for younger pupils. Their invisibility, like the majority of molecular processes, makes their static description very difficult. The author here describes a simple experiment in which the rounded tips of egg shells are but in a paper box. Pins or thin nails are fixed to the bottom of the box, pointing upward. After closing the box, it is shaken. The pins or nails break up the egg shells, which become small pieces. The egg shells represent molecules of food which are too large for absorption by cells and must therefore first be broken down, which is the function of enzymes.

instruction + biology, enzymes. experiment - 147309.

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305. TOMLEY, D.:
Plant water relations
Journal of Biological Education, 16, 1982, No. 4,
pp. 247-252. 8 figs.

The author here concentrates on the water relations existing within plants found on fields, where the physiological mechanism of the plant comes into its own. Tests should thus also be made in the field. The experiments described study two factors which cause a loss of water in the plant - the ability of soil to maintain water and the evaporation effect of the air. The plant can be viewed as a sensor which connects the soil which is usually more damp, with the air, which is insufficiently damp. Plants have a specific ability to regulate their loss of water. Experiments on this subject are easy to carry out under both field and laboratory conditions and make the physiology of the organism very clear, as well as providing information on the plant's ecology and the microclimate of its environment.

plant, water, plant physiology, experiment - 147309.

306. TRÄNKLE, E.:
Der genetische Code - Überprüfung der Optimalform im Computerexperiment (The genetic code- verification of optimum form in computer experiments)

Der matchematische und Naturwissenschaftliche Unterricht, 35, 1982, pp. 93-99, Lit. 5, 10 figs.

The article describes the structure, implementation and redundancy of information in the genetic code and its optimalisation in relation to the evolution of animals. A genetic code can be experimentally demontrated with the aid of a computer. The first genetic code was clearly written by Gamow and led to an intensive study of the problem. The author here discusses the problem of coding hereditary traits (proteins) in genes. The genes reproduce and the information is then transfered from cell to cell and from animal to animal. Proteins are the simplest molecules with a biological, i.e. catalytic or enzymatic function. Among the best known proteins are for instance insulin and hemaglobulin. With good coordination among individual proteins the structure and function of cells, and hence the whole organism, is enhanced. Proteins are capable of reproduction and for this reason biological information must always be read and translated to the protein function. The transmission of information in the cell, as we know it today, provides a possible basis for making the prerequisites of evolution theory according to Charles Darwin, i.e. natural selection, more precise. Eigen developed the rule of trial and errors on the basis of which we can simulate evolution on a computer. The rules of the game are taken from molecular biology (faulty reproduction, errors in the level of the gene), assessment at the protein level and the determination of the reproduction rate.

instruction + biology, genetics, genetic code, experiment, simulation - 147309.

307. TROMMER, G.:

Biologische Schädlingsbekämpfung als Schulversuch. Bacillus thuringiensis gegen Mehlmotten (Combating pests biologically a a school experiment. The germ Bacillus thuringiensis versus Ephestia külniela) Praxis der Naturwissenschaften, - Biologie, 31, 1982, No. 7, pp. 200-207. 3 figs., lit. 19.

The author provides instructions for an experimental project in an ecology course which deals with the biological combating of pests. It provides pupils with the opportunity of independent work and making a contribution to solving this problem. The outcomes of the biological and chemical combating of pests are compared, including their advantages and drawbacks. The author chose the insect Ephestia kühniela and as the medium of biological combat against it the germ Bacillus thuringiensis. At the same time pupils study the characteristics of chlorated carbohydrates in relation to the possibility of their acumulation in food chains. The biology of the insect Ephestia kühniela is also analysed, as well as the characteristics of the germ Bacillus thuringinesis and the methods of its use. For bees, ladybird bugs, or earwigs and warm blooded animals this germ is harmless. So far no resistence to the germ has not been developed by the insect in question. The whole course of the experiment and its technical aspects are described in detail.

instruction + general biology, zoology, biological combat, pest, experiment - 147309.

308. VODÁKOVÁ, J. - HAMÁČKOVÁ, B. - ZAJDLOVÁ, M.: Pěstitelské pokusy v 1. a 4. ročníku (Cultivation experiments in the 1st and 4th class)
Komenský, 106, 1981-1982, No. 7, pp. 417-420.

Experiments are an important method of instruction. A team of authors here provides information on the use and importance of cultivation experiments in the 1st to 4th classes of basic school. Experiments represent a demanding method which requires the professional training and preliminary preparations of the teacher, his extensive technical and theoretical knowledge in biology and agro-technology, as well as the skill required for the assessment of the experiment. A suitable selection of a material is very important; in this case this includes tools, vessels, soil, seeds or seedlings and the required space either indoors or preferably outdoors. All experiments described are related to the teaching syllabi use in the 1st to 5th classes of basic school. The experiments mostly study the influence of various factors on the development of a plant, plant nutrition, the testing of new strains, etc. These experiments are also demanding from the point of view of the time required, but they are so valuable that they should certainly by carried out.

instruction + plant cultivation, experimantal plot of land, experiment - 147309.

309. WAGENER, A.:

Experimentieren im Biologieunterricht (Experiments in biology instruction)

Naturwissenschaften im Unterricht, 30, 1982, No. 12, pp. 425-436. Lit. 20, 9 figs., 2 worksheets.

Experiments as a teaching method used in the natural sciences, especially in biology, are an important component of instruction, which requires a qualified teacher. The author discusses the basic requirements which experiments make of a teacher from the point of view of teacher training and the further education of teachers. Pupils, by carrying out experiments, learn the basic methodologies used in biology as a science and to do typical work connected with science. They learn to use experiments as a method of seeking answers to problems. Work with an original object provides pupils with practical experiences while being at the same time ostensive. In the upper classes of secondary school pupils should be able to plan their own experiments, formulate a hypothesis and analyse findings. They should also clean the instruments and put them away, write a protocol of the experiment and keep its records. In conclusion the author discusses the traits and skills which a teacher must have to supervise the experiments done by his pupils.

instruction + biology, instruction method, experiment - 147309.

310. WEBB, M.J.:

Physical and Chemical Change: What's the Difference ?

The Science Teacher, 49, 1982, No. 3, pp. 39-40. 1 fig.

Since the author expresses doubts about whether secondary school students understand the difference between physical and chemical change and since textbooks also do not provide sufficient and clear explanations concerning these problems, he provides several examples, which are based on the definition that a physical change changes the physical form of a substance, without changing its chemical properties, while chemical changes change the chemical properties of substances. As exemples of physical changes the author cites the examples of the sublimation of iodine, the distillation of water and the reaction of sulphur with iron, which is described in detail, as well as other experiments.

instruction + natural sciences, secondary school, terminology, chemical reaction, physical reaction - 147309.

311. WEGMANN, K.:

Die Photosynthese - Wissenschaft, aktuelle Forschungsthemen. Experimente. (Photosynthesis - its science. A current topic for study. Experiments)
Der Biologieunterricht, 18, 1982, No. 4, pp. 36-61.
Lit. 5, 9 figs.

The photosynthesis of green plants is the most important chemical process taking place on Earth. Annually, green plants make use of approximately 270.10^9 tons of CO_2 for the production of organic substances. The Earth's atmosphere contains about 2600.10^9 tons of CO_2 and the oceans another $35\ 000.10^9$ tons. Part of the assimilation product is again consumed in plant respiration. In every year 164.10^9 tons of plant products (dry matter) grow and of this, 109.10^9 tons grow on land and 55.10^9 tons in the seas. Less then 1% of this sum ($1.5.10^9$ tons) are used annually by mankind for food. The energy for photosynthesis comes from solar energy. The sun radiates between 400 to 700 nm, while the annual energy from the sun is 370.10^{12} MWh.

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The energy of fossile fules is 78.10^{12} MWh, the energy in the plant biomass is $9.2.10^{12}$ MWh, the annual energy of assimilation products is 730.10^{9} MWh and the annual energy consumption of mankind is 58.10^{9}. The sun annually radiates 5 times as much energy as the amount found in all fossile fuels combined. Fossile fuels combine 10 times as much energy as is found in the living biomass. Annually only 8 % of the living biomass is replaced. As little as 0.016 % of the energy on Earth would cover all the energy requirements of mankind.

The author goes on to discuss the teaching objectives of the topic photosynthesis. It touches closely on the life of mankind. He distinguishes between the light and dark stages of photosynthesis, the transportation chains of electrons with two light reactions and the function of electron transmission in redox reactions. Pupils should be able to distinguish electron transmission and the conversion of light energy into chemical energy in the course of photosynthesis (the creation of ATP), they should understand the Kelvin cycle as the road by which C from CO_2 is transformed into sugar and other organic compounds, methods for explaining various phenomena (marking with the aid of C^{14}, spectroscopy, etc.), ecological problems of biochemical reactions, photosynthesis in succulents and CAM, photosynthesis of the C_4 type, etc. These and other aspects of photosynthesis are described in detail, as well as its prerequisites, the structure of choroplasts, light and dark reactions, photochemical primary reactions, the transmission of electrons, two light phases, photorespiration, CAM and the diurnal acid cycle, the Hatch and Salck cycles, the photosynthesis of bacteria, photosynthesis and the fixation of N. In conclusion, topics for further study are indicated, as well as various didactical comments for experiments with photosynthesis.

instruction + biology, plant physiology, photosynthesis, experiment - 147309.

312. WILHELM, K. - STORRER, J.:
Sehraumbestimmung beim Menschen - Einsatz von selbstgebauten Perimetern im Gruppenunterricht der Sekundarstufe II. (Determining the space seen by a person. The use of self-made perimeters in group work in the upper classes of secondary school)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 5, pp. 296-298. 4 figs., lit. 4.

For instruction in human biology the structure and function of eye sight can be explained on the basis of a self-made perimeter, an instrument which makes it possible to determine the space seen by a person. The author provides instructions for the making of the instrument, which can then be used in experimental group work in the upper classes of secondary school. On the basis of the experiment, pupils can then define a field of view, the fact that the field of view for the white colour is larger than the field of view for other colours, that rods and cones have different functions in vision: they make it possible to percieve movement (rods - which differentiate light and darkness) or they make it possible to see colours (cones). Perimetry is very important for ophthalmology. (The use of the instrument teaches pupils how to work experimentally and to interpret the outcome of experiments). The pupil must understand the structure of the human eye and the function of the retina in order to do the experiments.

instruction + human biology, physiology, eye-sight, experiment - 147309.

313. WOOD-ROBINSON, C.:
The Burning Peanut
Journal of Biological Education, 15, 1982, No. 4, pp. 262-265. 4 figs.

The author describes several experiments using peanuts, which he uses as fuel for burning and a source of energy. For instance a peanut stuck on a needle and burnt over a Bunsen burner is then submerged into a test tube full of water and the temperature measured. Several similar, more complicated experiments are described; their description is accompanied with sketches. All the experiments can be done in a school laboratory.

instruction + biology, physiology, thermal energy, experiment - 147309.

314. ZIPKO, S.:
Wpływ tytoniu i używek na zachowanie sie solowca
(The influence of tobacco and spice on the behaviour of the brine shrimp)
Biologia w szkole, 35, 1982, No. 1, pp. 50-54.

The article is a translation on an article by Kocjan from The American Biology Teacher (No. 2, vol. 43, 1981). The author describes an experiment with the brine shrimp (Artemia salina), which can be done in a school laboratory to demonstrate the pathological effects of drugs on the body, as well as the physiological and chemical causes of the changed behaviour of the shrimp. At the same time pupils become acquainted with problems connected with experiments on animals in school in general. The experiments also support anti-smoking propaganda in schools; they can be done by the pupils themselves, under the supervision of teachers.

instruction + zoology, physiology + animal, anti-smoking education, experiment - 147309.

10. Biology instruction media

315. HRUBÝ, I.:

Pomůcky pro vyučování přírodovědě (Aids for natural science instruction)

Komenský, 106, 1981-1982, No. 2, pp. 95-97. 1 fig.

For teaching the natural sciences in the 3rd class of basic school the national enterprise Komenium produces very good teaching media. But besides these, teachers should also acquire natural objects and permenant multiplicates. In this context the regional principle should be applied and multiplicates from the close vicinity of the school should be acquired. The author describes in detail two types of aids which are permanent and which teachers can make themselves. One is a pressed flower collection on stiff paper, protected by a transparent foil or by plexiglass. The other are pressed flowers placed between two glass panes (old photography plates can be used). The author describes the making of these aids, especially a herbarium which demonstrates separately individual part of the flower.

instruction + natural sciences, basic school, lower grades, teaching aids, herbarium, multiplicated - 147311.

316. MÜLLER, K. - SCHNEIDER, G. - CHULZ, W.:
Zum Verhältnis von Biologiedidaktik und Mediendidaktik
(Concerning the relationship between the didactics of biology and the didactics of teaching media)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 7, pp. 197-200. Lit. 22.

The authors discuss problems connected with instruction from the point of view of general didactics and from the point of view of specialized didactics, such as for instance the didactics of biology. General didactics have the aim of defining the basic structural characteristics of instruction, its factors, planning implementation and analysis. The didactics of teaching media, in the authors' opinion, form the subject-matter of general didactics. However, not all technical media available at present are suitable for biology instruction and special biology didactics have created special media for biology. The theory of biology teaching media is dependent upon the pedagogical objectives and needs of biology instruction. General didactics cannot deal with the theory of using teaching media, since this is the task of special didactics.

didactics, teaching media - 147311.

317. REKHART, G.:
Medien im Biologieunterricht (Media in biology instruction)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 7, pp. 193-197. Lit. 5.

In the author's concept, teaching media represent the quality of the form of information supply, such as the elements and facilities by which this information is transmitted and illustrated; in other words they are the opposite of working media. The author enumerates various work media and discusses their advantages and disadvantages, as well as their importance for contemporary science education in schools. These media are divided into optical, acoustic and tactile; optical media dominate - they include the blackboard, magnetograms, transparencies, slides, films and TV. Models can be divided into real and functional models and models of a principle. Experiments and excursions are also discussed; in their course work media can be used extensivelly. It is difficult to select work media for biology instruction because constantly new ones are available; selections should be very carefully considered, with a view to the objectives which they are to fulfill. A film about a paramecium is sometimes more suitable than observing the paramiceum under the microscope. Computers are not used frequently enough. Didactical games for the simulation of some laws are also a good aid, for instance for the Hardy-Weinberg law.

instruction + biology, teaching media - 147311.

318. RODZIK, H.:
Pomoce dydaktyczne w nauczanie biologii w klasie V.
(Didactical media in biology instruction in the 5th class)
Biologia w szkole, 35, 1981, No. 1, pp. 44-45.

In the school years 1979-1980 and 1980-1981 new teaching syllabi for biology in the 5th class were introduced. The author points to various opportunities for the use of teaching aids, as well as possibilities for breeding animals or plants in school, collecting various natural objects, making foliograms, using textbooks and methodological handbooks and workbooks for pupils. In the course of instruction, priority should be given to experiments and observations and work with natural objects and their collection outdoors. The author provides specific advice concerning the cultivation of bacteria, blue-green algae, daltoms, spirogyra, mold, yeast, aquarium fish, the cultivation of potted plants, breeding paramedium, eyespots, amoeba, hydra grisea, planaria, worms, daphnia, copepods, crayfish, insects, cockles, snails and several mammals. The collection of material for school experiments can be undertaken by groups of pupils. Specimens can be mounted by drying, keeping them in a liquid, making collections of shells and conches. As substitutes for original natural objects the author recommends especially the use of foliograms.

instruction + biology, basic school, 5th class, teaching media, original object, workbook, foliogram - 147311.

319. MAMEDOV, S.M.:
Kak organizovan v nashey shkole ugolok "Lyubite prirodu"
(How in our school we organized an exhibition called Learn to Love Nature)
Biologiya v shkole, 56, 1982, No. 4, p. 69.

The education of youth in the spirit of a Communist worldview assumes also an education towards a love of nature and native region. A teacher in the secondary school in Darbilidzhi here describes how he set up a permanent exhibition with the name Learn to Love Nature. It includes sections on the wealth of the region, a collection of local plants, an aquarium, song birds in cages and a herbarium. The pupils independently make posters and bulletin boards on interesting items concerning nature conservation and various important political events.

instruction + biology, nature room, exhibition, original object, aquarium, herbarium, instruction medium - 147311.

320. RAZBESOV, O.K.:
Popugayi v ugolke zhivoy prirodi (Parrots in a living-nature room)
Biologiya v shkole, 56, 1982, No. 1, pp. 69-72.
1 tab.

The author discusses the breeding of parrots, in living-nature rooms. They are not very demanding. The author provides detailed information on the type of cage best suited to this bird, what to feed it and how to achieve its breeding and laying of eggs. The author recommends specific species best suited for this purpose, from the point of view pupils' independent work.

instruction + biology, living-nature room, breeding + birds, independent work by pupils - 147311.

10.24 Aquariums, micro-aquariums, terrariums, aqua-terrariums

321. SIEMON, M.:
Aquarien im Unterricht (An aquarium in school instruction)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 3, pp. 81-93. 2 figs. 9 worksheets.

The basic idea of this article is to arouse the reader's interest in independent work by pupils. Group instruction or instruction in pairs brings to the classroom a new positive climate for pupils' independent work. The topic cited in the title is divided into 14

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teaching lessons, with a three-hour period every week. It also assumes that the school has 5 to 6 aquariums, with water plants and fish and one model aquarium. The pupils during the work acquire knowledge and skills in the natural sciences, and they learn about a valuable leisure time activity. In the field of zoology they become acquainted with various species of fish and their variability, their way of life, as well as with water plants and the regimen in the aquarium. Long-term observations are carried out and the following specific objectives can be followed: an emotional relationship towards the animals being cared for, the observation and description of various phenomena, making comparisons between conditions in the aquarium and conditions existing in the wilderness, an understanding of the problem of providing the fish with sufficient oxygen, becoming acquainted with nature conservation principles (during the finding and collection of fishes and plants in their natural environment), working in groups, etc. This model project is intended for the 5th and 6th classes.

instruction + zoology, aquarium, breeding + fishes, teaching topics, independent work by pupils, model project for instruction, 5th - 6th class, education + objectives, teaching + objectives - 147311.

322. SIEMON, M.:
Haltung und Pflege von Aquarien im Unterricht in einer 5. Hauptschulklasse (Breeding fish and caring for an aquarium in the 5th class of basic school)
Der Biologieunterricht, 18, 1982, No. 1, pp. 37-62.
Lit. 25, 5 worksheets, 2 tabs.

The biology teaching syllabus used in Hessen (FRG) provides time for a topic selected by the teacher.

The author suggest a project which deals with aquarium fish; pupils do independent work in a nature room. It also makes possible the implementation of interdisciplinary relations and pupils learn various technical skills and become acquainted with an activity which may later become their leisure-time hobby or may lead to membership in a hobby club. In the 5th class the following tasks for study can be given: the instinctive and aggressive behaviour of aquarium fish, their movement, a comparison of the development of fish and amphibians. In the 6th class the following problems can be dealt with: food eaten by the fish, oxygen in the aquarium, the production of food and biological equilibrium. A correct approach to this topic assures the effectiveness of instruction, the development of observation abilities, an immediate contact with an original object, the development of an interest in this subject on the part of pupils and direct contact with the subject-matter in question. Pupils should have the opportunity to found the aquarium and to obtain the fish and the plants by themselves. The project is divided into 14 teaching lessons,

teaching syllabus, instruction + biology, breeding fish, aquarium, independent work + pupil, basic school, 5th class, FRG - 147311.

10.26 Breeding animals in schools, creeding facilities, the collection of animals. Calendars for collecting fauna.

323. ELLWOOD, R.L.:

Social Organization of the Mongolian Gerbil

Journal of Biological Education, 16, 1982, No. 4, pp. 236-241. 3 figs.

The Mongolian gerbil (Meriones unquiculatus MILNE-EDWARDS 1867) lives in a social hierarchy based on community life of the male, female and their young offsprings. The adult male and offsprings together with the adult female care for feeding the newborn. This specie is active both during the day and night and for this reason it is an ideal object for school observations. Its social life can be observed, as well as its behaviour and care of the young. The maternal behaviour of the female is influenced by various factors, as is the social development of the young. This can be made use of in simple school experiments, which the author describes. He also desdribes the gerbil's social life and especially the role of the male in detail.

instruction + zoology, original object, breeding + mammals, observation, experiment - 147311.

324. HAGEN, H.H.:
Zur Einbürgung und Haltung von Hummeln in Nistkästen
(Domesticating and keepign bumble-bees in nest boxes)
Praxis der Naturwissenschaften - Biologie, 31, 1982,
No. 7, p. 200, 3 figs.

The author describes a method of keeping bumble-bees in nest boxes, which allow the bumble-bees to go in and out freely. The method has been improved through the years, so that now the bumble-bees are bred in accord with their needs; the female need not be closed in for long periods of time and there is no need for a long entrance flight corridor. The author stresses the importance of keeping bumble-bees because in the FRG more than half the bumble-bee species are threatened. Also nettles should be conserved, since they are the main source of food for bumble-bees.

original object, breeding + insect, method + breeding - 147311.

325. HAVLÍČEK, K.:
Zkušenosti se získáváním živočichů na hodiny přírodopisu. Na pomoc učitelům při studiu nových učebních osnov
(Experiences with obtaining animals for nature science instruction. Aid to teachers in studying the new teaching syllabus)
Přírodní vědy ve škole, 33, 1981-1982, No. 3, pp. 84-87.
Lit. 8.

The article concentrates on the new concept of zoology teaching in the 6th class of basic school. The author recommends the collection and keeping of invertebrates in a living-nature room and makes various suggestions for their use in instruction. The following insects are recommended: the Diadem spider, Agelena, Thomisus albus, the hard-tick, crayfish, the green locust, the grasshopper, 8 different dragonflies, the cabbage butterfly, the mole cricket, the click beetle, various ground beetles, the glowworm, the diving beetle and the mosquito. The author describes the collection, breeding, feeding and observation of these arthropods.

instruction + zoology, teaching syllabus, collection + arthropods, breeding + arthropods, observation - 147311.

326. KOBETNIK, A.N.:
Gotovim yunikh zhivotnovotsov (We train young animal breeders)
Biologiya v shkole, 56, 1982, No. 1, pp. 66-67.

The author describes the work of pupils in the 9th and 10th classes of secondary school, who cooperate with farm-animal breeding enterprises and the Agricultural College in Zhitomir. Within the framework of this cooperation the pupils, under the supervision of specialists, contribute to the solution of various problems important for the further development of agriculture. Some of these problems are described in detail. In conclusion the author sums up the importance of this work not only for improving pupils' knowledge in biology, chemistry and work education, but also for vocational guidance, the making of a vocational choice and the forming of a positive attitude towards work in agriculture on the part of the pupils.

instruction + zoology, secondary school, breeding + mammals - 147311.

327. KOLB, C.L.:
Behaviour Experiments with the African Frog
The American Biology Teacher, 44, 1982, No. 9, pp. 542--551. 3 figs.

The author describes the breeding of the African frog (Xenopus laevis DAUDIN 1803), which can be kept in a living-nature room or in a laboratory with minimum costs. Experiments can begin already in the embryo stage and can continue until the frog becomes an adult. The author provides descriptions of a total of ten different experiments using this frog, which will inspire students to plan their own projects. This frog is suitable also for ethological experiments, since it cares for its young and from a systematic point of view it belongs to those frogs which live constantly in the water.

instruction + zoology, breeding + frogs, observation, experiment - 147311.

328. Nistkästen für Insekten (Nest boxes for insects)

Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 9, pp. 280-282. 3 figs.

Hymenoptera are the largest group of insects, after the beetles and butterflies. There are about 10 000 different species and in the FRG 560 species live. They are very important ecologically and from an economic point of view. Some species become pests in forestry monocultures, but the majority of these insects are useful. Among them are the bees, the Leas-cutting bees (Megachile), the genus Hylacus, Specoidea, Trypoxylon, Ectemnius; among the Vespoidae, the Eumenidae are important. Nest boxes can be made from the hollow stems of plants, such as straw, blackberry bush twings or drilled Wild elder branches, as well as reeds which are placed in an empty tin can and fixed to a tree branch. Also smaller cubes of wood into which corridors in various directions are drilled can be used. Then we must wait and see which species will occupy the nest. The author enumerates a number of insects which were captured and identified in this way.

instruction + zoology, hymenoptera, breeding + insects, observation - 147311.

10.261 Zoological gardens

329. DVOŘÁKOVÁ, S.:
Zoologické zahrady školám (Zoological gardens and schools)
Přírodní vědy ve škole, 33, 1981-1982, No. 5, pp. 170-171.

The article provides information about the regional opportunities which shools have to make use of zoological gardens in view of their site on the territory of the Czechoslovak republic; their utilisation is especially important in the 6th to 8th class of basic school. The majority of Czechoslovak Zoos have a sufficient number of those species which are found in the zoology teaching syllabus for the 6th grade, which includes the topics Foreign reptiles, The environment of birds, The environment of mammals and The most important mammals of the various continents. In the 7th class this concerns the topic The animal precursors of man and in the 8th class Man and the environment. The author cites another 9 topics which can serve as independent assignments for pupils. In conclusion the article cites the addresses of all zoological gardens and a list of all animals which they have and which are also found in zoology textbooks.

instruction + zoology, original objects, zoological garden - 147311.

330. VESELOVSKÝ, Z.:
Zoologická zahrada a škola (The zoo and school)
Přírodní vědy ve škole, 33, 1981-1982, No. 1, pp. 3-4.
14 figs.

The Prague Zoo has a total of 3000 animals of over 500 species from all the continents and all zoo-geographical areas, some of which no longer exist in the wild. From the point of view of school, a number of the animals cited in the zoology teaching syllabi and textbooks for basic schools and general education secondary schools are found there. The Prague Zoo was openned on September 28th, 1931 thanks to the endeavours of Jiří Janda, a secondary school teacher, who also became the first director of the Zoo, when he was 66 years old. The oldest Zoo in the world is in Vienna (from 1752) and the second oldest was openned in Paris (the Jardin des Plantes in 1793). The author extensively discusses the history of various zoos throughout the world. The Prague Zoo has been modernized and now provides education which supplements school instruction, from kindergarten up to institutions of higher learning. At present we see that children know much more about zoology than adults. Children from kindergarten (4 to 5 year olds) now are able to recognize between 70 and 100 species of animals, but the majority are tropical animals. Our zoos should to a greater extent have those animals which live wildly in this country. As far as systematic work with school children is concerned, our zoos have a foremost place in the world. The Prague Zoo has developed a unified system of making use of the garden within the framework of school instruction, in cooperation with all types of schools. The system of education for pre-school aged children is especially successful. The Zoo also publishes a number of didactical media, such as posters and didactical tests. Pupils in the district of Prague 7 can come to the zoo free of charge. Still, only 4 % of Prague children visit the zoo once a year. Annually Czechoslovak zoos are visited by 4 million. For Prague this number is between 700 and 750 thousand. The Club of Friends of the Prague Zoo which was founded 14 years ago has among its members over 700 children. The Club of Young Natural Scientists has another 180 young members, but many more would like to join. The Zoo organises a common program with the Planetarium called The future of the Blue Planet, which concerns nature conservation and environmental control. The Prague Zoo also educates young members of the staff for all Czechoslovak zoos in a special agricultural apprentice training centre (a four year course ended with a school-leaving examination). During the summer the Zoo organises summer schools for young people, annual competitions, biology Olympiads, etc. Members of the staff of the Prague Zoo act in the capacity of consultants for the writing of diploma theses for students of the Natural Science Faculty of the Charles University.

instruction media, instruction + zoology, original object, zoological garden - 147311.

10.271 A school plot of land, botanical gardens, young natural scientist stations, school biology centres, school forestry areas, scientific trails

331. FRANZ, D.:
Lernort Botanische Gärten (The botanical gardens as a teaching place)
Naturwissenschaften im Unterricht - Biology, 30, 1982, No. 8, pp. 303-313.

While it is true that pupils are usually less interested in plants than in animals, nevertheless schools are frequent visitors to botanical gardens, whose extensive collections allow them to fulfill all the objectives a school has in this area, such as acquainting pupils with domestic and wildly growing plants, cultivated plants and plants growing elsewhere. In the FRG there are 60 botanical gardens. These gardens are very well suited for botany teaching, because the pupils have the possibility of seeing the plants in question, which cannot be seen otherwise (such as palms, a number of orchids, crop plants from foreign countries, insectivorous plants), as well as plants which in earlier times grew wildly, but now have become rare or plants which are interesting from a morphological, systematic of phyto-geographical point of view. Also plants which are economically important and those which are protected can be seen. The author deals in detail with a lesson to acquaint pupils with insectivirous plants (Droseraceae, Lentibulariaceae, Nepetheceae, Sarraceniaceae and Cephalotaceae). The plant Dionea muscilapa ELLIS is dealt with in greater detail.

Another lesson deals with plants which provide spices, and the author enumerates a number of them.

instruction + botany, original object, teaching media, botanical garden - 147311.

332. GÖGER, F.:

Alterstufengerechter Gartenbauunterricht (Teaching in a school garden in a manner adequate to a specific age group)

Der Biologieunterricht, 18, 1982, No. 2, pp. 38-40.

Work in a school garden has a long tradition in the FRG. In 1919, on the basis of the iniciative of E. Molt, an industrialist and cigarette maker, a garden was founded within the framework of his strivings to give his employees the best possible education. He concentrated on gardening and organized the work of preschool aged children in the garden. The author also deals with contemporary school work done in gardens, especially in the 6th to 10th classes. The importance of this work for the children's health is stressed, as well as for the forming of practical skills, knowledge and habits.

instruction + botany, original object, school garden, history, present period, FRG - 147311.

333. JANIKOWSKI, W.:

Ścieżki dydaktyczne w praktyce szkolnej (Didactical trails in practical school work)

Biologia w szkole, 35, 1982, No. 1, pp. 27-31. 1 fig.

Educational trails have been in existence since the end of the 18th century; at the end of 1960 they were modernized and put to new uses in the GDR, then in Czechoslovakia and in Poland. An educational trail is used for excursions, where the course of the trip is known ahead of time, so that possible surprises, dangers or barriers are eliminated and the participants know in advance what they are specifically supposed to observe. This requires preparations on the part of the teacher who must prepare everything in advance and of course must know the terrain, its geological, botanical and zoological special aspects, etc. The best length of such a trail is 10 kilometers and 5 to 6 study objects on each kilometer of the trail. The excursion can also concentrate on nature conservation aspects and aspects concerning environmental control. The author, on the basis of examples, describes how such a trail can be founded.

instruction + biology, original object, didactical trail - 147311.

334. KIRSHOFER, R.:
Unterrichtsstätte Zoo: Stellwert der Zoopädagogik. Bedeutung von Zoo-Lehrwegen (Teaching in the zoo: The importance of the didactics of zoology. The significance of zoological scientific trails)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 8, pp. 286-303. 9 worksheets, lit. 25.

Zoological gardens represent a valuable contribution to zoology teaching. The author discusses the use of a zoo as a place for teaching zoology. First he describes the history of zoos throughout the world, the sequence of their founding, and current trends in their development, as well as the use which schools make of zoological gardens. Several models of cooperation between schools and zoos are described - the Frankfurt model, the Cologne model and the Hamburg

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model. Educators usually stress the following teaching objectives which have priority in the use of the zoo for instruction: to learn about animals in the wilderness and the demands they make on the environment, their behaviour , to learn about animal breeding and the care which wild animals require, the correct assessment of their role and avoiding anthropomorphist attitudes, providing pupils with a knowledge of relations which exist between man and living nature and with measures taken to conserve wildly living animals, becoming acquainted with systematic relations, relations between structure and function, the adaptation of animals to a specific environment on the basis of their colour, shape of body, behaviour, the natural relationships existing between animals (systematics) and phylogeny relations, becoming acquainted with the individual development of an animal and the biological reasons for its behaviour. The author also provides information about a zoology science trail where the topic "The adaptation of animals to the environment" can be studied.

instruction + zoology, original object, zoological garden, scientific trail - 147311.

335. KUZENKOVA, L.J. - DERVIZ-SOKOLOVA, T.G.:
Zelenaya apteka i yeyo okhrana (A green pharmacy and its conservation)
Biologiya v shkole, 56, 1982, No. 3, pp. 66-68.

The authors discuss problems of the conservation of medicinal herbs, their supervised collection and cultivation. Schools often organize the large-scale collection of medicinal herbs but the authors warn teachers especially in the vicinity of large cities and in densly populated areas, that regulations concerning the conservation of medicinal herbs must be taken into account and fully adhered to. By the continuous picking of medicinal herbs their numbers have severly decreased in many areas and for this reason measures have been taken to conserve some of them. The authors go on to describe the work of a hobby club of young natural scientists who undertook a study of the frequency with which medicinal herbs grow wildly. In conclusion the authors stress the possibility of cultivating medicinal herbs on school plots of land and provide a list of such plants, which are suitable for cultivation.

nature conservation, medicinal plants, collection, cultivation, school plot of land - 147311.

336. MUSIL, J.:
Katedra přírodovědných a technických činností institutu PO SSM (The Department of Natural Science and Technical Activities at the Institute of the Young Pioneer Organization of the Socialist Union of Youth)
Přírodní vědy ve škole, 33, 1981-1982, No. 5, pp. 171-172.

In 1971 the decision was made to found the Institute of the Young Pioneer Organization of the Socialist Union of Youth at Seč. It has since then become the central training unit for those working in the Young Pioneer Organization. First a study centre for the natural sciences was founded and since 1975 also a study centre for natural science and technical activities exists. The author provides information about the department and its teaching activities, about the newly established Young Pioneer workroom, the education of political and moral attitudes and the methodological, professional and practical training at Seč. Also the teaching of mandatory and elective subjects at the Institute, in all forms of secondary education or in the form of extramural studies at the teacher training faculty at Hradec Králové are described. Short-term course, seminars and consultations are held at Seč, as well as practical training. The Institute has its own secondary pedagogical school. At the same time the Institute organizes the study of natural science activities undertaken by the Young Pioneer Organization.

instruction + institute, Young Pioneer Organization, natural science activities, organization - 147311.

337. OPHER, P. - SCHROEVERS, M.:
Anleitung zur Einrichtung eines Stadtlehrpfades - Übersetzung von Ulrich Kleiner (Instructions for the openning of a municipal science trail. The example of Ulrike Kleine)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 9, pp. 340-343. 3 figs.

In October 1978 a conference of the European Council for Education towards Environmental Conservation in Southern Europe was held in Lisabon. The authors of the article were also the organizers of the conference. The report on the conference is illustrated by drawing made by Don Aldridge from Perth in Australia. The authors prepared a project for the forming of a municipal science trail in Lisabon; for this purpose they chose the Alfama district, which is in the old section and forms the historical nucleus of the city. The trail was prepared for 12 to 15 year-olds. The earthquake which destroyed much of the city in 1955 did not detroy this section and it thus includes very old palaces and buildings. This urban trail serves for a typically comprehensive excursion, which deals with geology, petrography (fossils found in the building material and in rock protrusions), wildly growing plants on walls, the material of the sidewalks (from a geological, petrographic and mineralogical point of view). The pupils also study the plants found on balconies, in gardens and courtyards, the animals found in the streets and elsewhere, children, shops, graffitti, they list the advantages and disadvantages of living in this section of the city, they examine the danger of fire and fire prevention, garbage disposal, the transportation of the sick, problems connected with automobile traffic and tourism. Also the climate, the number of people on the streets, etc. are studied, as well as forecasts for the future development of the section. In this way interdisciplinary relations are made use of in fieldwork.

science trail, big city, Portugal - 147311.

338. PECHA, M.:
Školní naučná stezka přírodopisná Křivoklát otevřená
(The school science trail in the Křivoklát area has been openned)
Přírodní vědy ve škole, 33, 1981-1982, No. 2, pp. 47-49.
4 figs.

Science trails provide opportunities for acquainting pupils and other visitors with the natural wealth and interesting things found in a large area, while at the same time guiding the flow of visitors in such a way that the most valuable sections of a protected area are not disturbed or damaged. Natural science trails have a special status among them. One such trail was recently openned by the staff of the Křivoklát Protected Area (since 29.9.1980) and given to the Young Pioneer Organization at the basic school in the town of Křivoklát. The work connected with the openning of the trail was done by a number of various organizations and institutions. The trail will serve above all as a teaching aid for pupils of basic schools but it will also serve tourists and for individual recreation, group visits and for family camping.

science trail, basic school, Young Pioneer Organization - 147311.

339. SAMOLYOVA, T.P.:
Recommendatsii po organisatsii pitomnika drevesno-dekorativnikh i yagodnikh rastenii v shkole
(Recommendations for the organization of a nursery for fruit and decorative woody species in school)
Biologiya v shkole, 56, 1982, No. 6, pp. 72-75. 4 figs.

On school plots of land dendrariums can be founded, which cultivate fruit and decorative trees and shrubs for planting in the vicinity of the school and in local parks. Pupils learn to use a plot of land for the cultivation of seedings or cuts. This activity should begin in the 5th class so that by the 8th and 9th classes pupils begin to see the outcome of their work. The author provides various advice about how to found a tree nursery, the selection of a site, the need for a fence or hedge, choice of soil and how to improve it, requirements concerning seeds or cuts, how to seed, the use of stimulators and other work connected with cultivating trees.

work on plot of land, original object, school plot of land, tree nursery, orchard development - 147311.

340. ZAKHARCHENKO, G.G.:
Planirovanie raboti shkolnogo lesnichestva (Planning the activities of a school forestry operation)
Biologiya v shkole, 56, 1982, No. 3, pp. 59-65. 3 tabs.

A school forestry operation is a form of socially beneficial work which at the same time provides opportunities for pupils to learn various skills and knowledge; they are also educated towards nature and environmental conservation. A necessary prerequisite of successful and effective work is its planning. The purpose of the article is to acquaint the reader with experiences gained in the planning of such activities and to provide practical instructions for drawing up an annual plan of work. Various projects which can be undertaken within the framework of such activities are summed up in a table.

school plot of land + forest, work education, education towards the conservation of the environment, original object - 147311.

341. KOMASARA, P.:
Ekspozycja zwierząt bezkręgowych w muzeum oceanigraficznym Mir (An exposition of invertebrates in the Mir oceanographic museum)
Biologia w szkole, 35, 1982, No. 4, pp. 123-125.

Museums have both cognitive and didactical tasks. The exhibition of the MIR oceanographic museum is unique, It acquaints visitors with invertebrate marine animals, which the majority of teachers and pupils have never seen. Also the history of the sea depths and the present stage of utilizing the sea bottom with its enourmous wealth by mankind are shown. The article briefly deals with individual systematic groups of marine invertebrates, in the context of the museum exposition and the needs of schools.

original object, museum, oceanography, the sea, invertebrates - 147311.

342. ZICHÁČEK, V.:
Exota ´83 (The Exota exhibition in 1983).
Přírodní vědy ve škole, 33, 1981-1982, No. 8, p. 291.

An exhibition of exotic birds called Exota ´83 was held in Olomouc. From January 24th,1980 to February 3rd, 1980 the World Championship of Birds took place and in October 1980 the exhibition called Exota ´83 was held. Both exhibitions were held in the pavillions where annually the Flora Olomouc flower show is held. The competition and exhibitions both had international participation. The exhibition concerned mostly parrots, exotic chaffinches and canaries; outdoors in the park pheasants were shown and in the pavillions also aquarium fish. The exhibition contributed to young people forming a positive attitude towards nature and its conservation.

original object, teaching medium, exhibition, birds, fish + aquarium - 147311.

10.46 Osteological specimens, specimens of skin derivatives

343. MALINOVSKAYA, M.N. - GRAMENITSKIY, B.A. - KHRUSTALEVA, T.N.:
Izgotovleniye preparatov zhzhenoy i dekaltsinirovannoy kosti (The making of mounted specimens of sintered and decalcinated bones)
Biologiya v shkole, 56, 1982, No. 5, p. 47.

The authors describe how to rid bone specimens of calcium and organic remnants. Such specimens can then be used as teaching aids for topics found in the teaching syllabus for the 8th class concerning the function of bones.

instruction + human biology, system + bones, original object, bone + specimen - 147311.

10.49 Animals preserved in fluids

344. NIKISHOV, A.N.:
Khranenie i remont vlazhnykh preparatov (The storage and repairs of fluid specimens)
Biologiya v shkole, 56, 1982, No. 5, p. 36.

The author describes how specimens preserved in fluids should be stored and repaired; he concentrates on those specimens which are regularly used as demonstration objects. The producer guarantees a life-span of only 1.5 years. But if they are correctly stored and if their preservation fluid is supplemented, their life span can be greatly increased. The author also provides instructions on how to make the preservation fluid with which the specimens are supplemented.

instruction + biology, original object, specimen preserved in fluid, instruction medium - 147311.

10.51 Microscopy specimens of plants

345. LAROCHE, J.:
De l'emploi du vernis a ongles lorque l'utile se joint à l'agréable)On the use of nail polish or combining the pleasant with the useful)
Biologie, Géologie, 69, 1982, No. 1, pp. 235-238.
7 figs.

The study of epidermal cells is a very interesting topic in the biology syllabus. The author describes how to obtain specimens from leaves or peel with the aid of nail polish, so that the epidermal cells are clearly visible. The cells can be then photographed and/or microphotographed. The pattern of these structures remind one of abstract painting and besides serving as a source of knowledge in biology they can also serve as a source of inspiration for drawing and painting. The author also provides instruction for giving assignments concerning the epidermis.

instruction + biology, original object, microscopic specimen, plant, mocroscope, micro-photograph, practical excercise - 147311.

10.61 Models

346. CLARK, S.A.:
A Hands-on Model of DNA
The American Biology Teacher, 44, 1982, No. 2, pp. 100-110, 11 figs., 4 tabs.

To understand the function and activity of a DNA molecule is not easy. It requires a difficult mental process; the author herself admits that it took her very long before she fully understood the process of protein synthesis. To demonstrate it effectively in school, she designed a model of DNA in which it is possible to freely move the components. The model is not expensive and can be made in a school workshop. Its design and construction is described, and the description is accompanied by numerous sketches. The author describes the use of the model in school and cites numerous examples of how the DNA model can be used to demonstrate various processes in molecular biology.

instruction + general biology, mode, DNA - 147311.

347. GULEWICZ, K. - TWARDOWSKI, I.:
Modele rybosomów (Models of ribosomes)
Biologia w szkole, 35, 1982, No. 3, pp. 173-177.
Lit. 4, 4 photos, 3 figs., 1 tab.

The authors here develop a model of prokaryotic ribosomes 70, a RNA model with indicated anti-codons and the model of an eukaryotic ribosome. Ribosomes are made of proteins and ribosomal RNA, which are macromolecules with an asymetric structure, composed of two sub-units containing RNA, informationRNA and a newly synthesized polypetic chain. Two basic types of ribosomes exist: one is S 70 composed of the sub-units 30 S and 50 S, which are found in prokaryotic organisms (with no nucleus) such as bacteria; the other is S 80 (formed by the sub-units 40 S and 60 S) and found in eukaryotic organisms (which have a nucleus). The article also has photographs of the models, descriptions of their structure and opportunities for their use.

instruction + general biology, model, ribosome - 147311.

348. HADEL, W.:
Funktionsmodell zur Darstellung von Streckenreceptoren
(A functional model to demonstrate extension receptors)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 10, pp. 360-362.

The author first describes the functioning of extension receptors in the muscles and tissues. Their function can be shown with the aid of a simple model and experiment. Its advantage is that it leads pupils to independent work. For electrical measurements, pupils must know about the Hook and Ohm laws. They first learn about elasticity and the electrical conductivity of substances and how elasticity can be measured electrically. In the cells of muscles, sensors are found which monitor the extension of muscles. This information is carried to the brain by electrical impulses.

instruction + human biology, physiology, muscle system, nerve system, model - 147311.

10.7 Two-dimensional representative media

10.71 Films (school films, popular science films, film cassettes, etc.)

349. DYLLA, K.:
Medium Film: WWF hilft helfen, damit sie überleben
(Films as instruction contribute to survival)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 8, p. 255, 1 fig.

The author describes films made by the German World Wildlife Fund on the conservation of threatened flora and fauna. The films concern ethology and the ecology of these species and show the consequences of man's negative influence on the environment. The need to preserve various types of biotas is stressed, if threatened species are to survive.

instruction + biology, film, instruction medium, conservation of environment. - 147311.

350. KRUMBACH, K.H.:
Der Film im Biologieunterricht (Films in biology instruction)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 3, pp. 108-110.

Films are one of the most frequently used instruction media in biology teaching. But the criteria for the selection of films for instruction are still not clear. Many of the problems concerning the didactics of using films lack clarity, as well as the criteria which define the limitations of their use. In German

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education stress has been placed on the democratization of teaching and strengthening the use of psychology, while often leaving aside problems of teaching media. Now is the time to rethink and newly define the place and function of teaching media. The author provides information on the assessment of school films and their utilization, especially in biology teaching. Among the objectives of using films are the following: stimulation and motivation of pupils, mediating information, solving specific problems, defining a problem, strengthening and transferring knowledge, providing incentive for work with an original object. Films can also be used for individualization and differentiation, as well for intensification and optimalization of the teaching process, etc. The majority of the films available are suitable especially for improving motivation and the exposition of specific subject-matter, but most of them require the use of further teaching media. In the future, the making of school films should concentrate on a specific stages of teaching.

instruction + biology, instruction medium, films - 147311.

351. MOROZOVA, L.F.:
Ispolzovanie ekrannikh posobiy pri izucheniyu biologii
(The use of projection media in biology instruction)
Biologiya v shkole, 56, 1982, No. 3, pp. 33-38.

The author comments the use of films, slides, tranparencies and other audio-visual instruction media for teaching zoology. On the basis of examples, which are expalined in great deteil, she describes the use of available films. She recommends showing them in various parts of the lesson and supplementing them with explanations by the teacher. Also the use of transparencies is described, which are especially usefull in explaining the internal structure of animals. In conclusion the author discusses opportunities for combining various media which a teacher has at his disposal.

instruction + biology, instruction medium, films, slides, transparencies - 147311

352. NĚMEČEK, M.:
Český biologický školní film - historie a současnost
(The past and present of Czech biological school films)
Přírodní vědy ve škole, 33, 1981-1982, No. 9, pp. 322-324.

The first school which made use of biological films was the technical general education secondary school in Tábor, where one of its teacher, Dr. Kašpar, in 1913 bought a film projector made by the firm Ernemann; he used his own money to buy the projector and used it for 35 mm films. Short science films were made as early as the beginning of the century and were shown as additions to feature films. These films were also used in schools. In the period between the wars the use of films was extended and special screenings for pupils were organised. In 1923 the firm Comenium film was organised, but after two years it went out of business. In the twenties, 18 % of the total number of films made were intended for use in schools. At first the screening of films in schools was done after school and usually besides science film, another short film was added and performances lasted from one and half to two hours. At the beginning of the thirties the first sound films were made, but most of the films shown were still imported. The newly introduced school curricula in 1933 already required the use of slides

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and films in class, but it was only in 1936 that the Ministry of Education acknowledge films as a specific teaching medium. In 1937 the Ministry of Education set up a special committee to approve school films, which in the course of 1938 approved a total of 83 films. By the beginning of 1939 already 1000 Czech schools had a Scolar film projector made in Czechoslovakia. The centre of school film production was the town of Zlín (renamed Gottwaldov after the war). After 1945 the film industry was nationalized and the development of school films was extended. Films made by the Brno teacher Dr. Jan Calabka were of outstanding quality. In the sixties the production of school films was taken over by the national enterprise Učební pomůcky (Teaching aids), which used the studios of popular science films in Prague, Brno and Gottwaldov and made some very good films. At the beginning of the sixties the majority of teacher training schools openned special departments, which were adequately equipped to train future teachers in the use of films and other audiovisual aids. Since 1970 the number of films produced again began to increase. In 1974 a national seminar on school films was organized which held a festival of school films. The experiences thus gained were used to prepare the 1st international festival of school films from the socialist countries - called Schola film - which was held in Brno in 1975 and then again in 1978 when 85 films were shown. A benchmark in the development of school films was the production of film cassettes Super 8 mm, which have gradually been introduced into our schools since 1971. The first was made on the basis of the iniciative of V. Kocián for human biology and then for botany (by H. Střihavková), and for zoology in basic schools, as well as general education secondary schools

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(by A. Altmann). Cassette films are now the property of every school so that complications with their borrowing are done away with. The article also contains a list of a biology school films made in the period 1940 to 1980.

instruction + biology, instruction medium, film, school film, history, present situation - 147311.

353. NĚMEČEK, M.:

Počátky českého filmu (The beginnings of Czech school films)

Učební pomůcky ve škole a osvětě, 21, 1981-1982, No. 4, pp. 62-63.

In 1981 45 years had passed since the Ministry of Education in Czechoslovakia approved 16 mm films as a suitable instruction medium for all types of schools. The first schools in the country which experimented with the use of 35 mm films in instruction were the Mining College in Bánská Štávnica (in 1910) and three years later the Technical secondary school in Tábor (Dr. Kašpar around 1913 who used his own projector made by the firm Ernemann). The school at Tábor owned around 20 films. In 1923 the first non-inflammable 16 mm safety film was made (by Kodak) and in 1921 the first 9.5 mm film by the French firm Pathé. Both types of films came into use in Czechoslovakia during the thirties. The best results were achieved with 10 mm film at an experimental school in Zlín (teacher J. Novotný), which also owned an extensive film library. J. Novotný together with J. Suchánek and F. Kysela, aided by the Ministry of Trade and the Czechoslovak Red Cross made our own, Czechoslovak school films for the first time. Kysela also became the first director of a newly founded State Film and Slide Institute in Prague. J. Pleva organized a film-lending service. In 1936 the Ministry of Education issued a decree to approve their use in schools. The first Czechoslovak film projectors carried the brand names Prisma, Jubular, Scolar and OP 16.

instruction + biology, instruction media, film, school films, didactical technical media, history, present situation - 147311.

354. REICHERT, G.:
Zwei Filme zum Thema "Photosynthese" (Two films on the topic of "photosynthesis")
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 6, pp. 189-190.

The Westermann firm has produced two new films on photosynthesis for use in schools. The films are accompanied by sound cassettes, since both require a commentary. Both films deal with the problem in a complex manner and demonstrate that all mechanisms require a constant supply of energy: the only ultimate source of energy is the sun. But its energy can be directly utilized only by green plants, while other organisms are dependent upon the sun only indirectly, by the development of food chains. On the basis of the example of a cow at pasture, the film shows what the cow supplies to further links in the food chain. Also fossile sources of energy are shown and special effect sequences show the photosynthesis process. The second film deals with individual partial processes taking place in photosynthesis, cyclical and noncyclical phosphorylation, energy transport, hydrogen and electrons in the Calvin cycle. Both films aim at showing that all organisms, including man, are directly or indirectly linked through food chains and networks to green plants. The films allows pupils to achieve an understanding of the principle of phytosynthesis and its most important partial processes. Photosynthesis is not only crucial for agriculture, but also for the quality of the environment. A viable replacement for fossile fuels is yet to be discovered.

instruction + biology, instruction medium, film, photosynthesis - 147311.

355. TREBIŠOVSKÝ, V.:
Pohľad na štyridsať rokov tvorby slovenských školských filmov (A look at fourty years of making Slovak school films).
Učební pomůcky ve škole a osvětě, 21, 1981-1982, No. 1, pp. 12-14.

The beginnings of the organized production and distribution of school films in Slovakia are linked to the founding of the Institute for School and Educational Films (which used the acronym Školfilm) in Bratislava. The legal statute of the institute was created in 1940 and by 1941, i.e. 40 years ago, the first films were made. In the period 1940-1949, Školfilm made 69 films. In 1948, after the founding of the Czechoslovak State Film Enterprise, the organizational and legal foundations were formed for the broad development of professional film making in Slovakia. In Bratislava a studio of popular science films was openned, which from 1958 was entrusted with the production of school films. The Pedagogical Research Institute in Bratislava began to prepare the making of these films from a subject-matter point of view, as well as the distribution of the films to schools and their methodological utilization, together with a study of their impact and their assessment. In the period 1952 - 1957 about 5 films were made annually, in the period 1958 - 1959 this number increased to 10 and in the period 1960 - 1961 to 21 films annually. All in all, during the last 40 years, a total of 350 school films have been made in Slovakia for all teaching subjects.

instruction + biology, instruction medium, film, Slovakia, history - 147311.

10.72 Television and radio in school

356. ROMANSKI, S.:
Eine Möglichkeit des Einsatzes von Fernsehsendungen in Klasse 10 (One possibility for making use of television programs in the 10th class)
Biologie in der Schule, 31, 1982, No. 12, pp. 529-530.

In preparing programs the author makes use of material published at the K. Liebknecht Faculty in Potsdam. The article contains information on the programs and their structure, as well as suggestions for making use of the program within the framework of teaching specific subject-matter. Before the program begins, the author in her class writes questions on the blackboard, which the pupils are asked to answer after the program; they are divided into groups for this purpose. Each group recieves a question and the pupils can consult their notes, taken during the broadcast. The article includes a list of questions for this purpose.

instruction + biology, instruction medium, television, group instruction - 147311.

357. SCHUBERT, F.:
Hinweise zur Unterrichtssendung des Fernsehens "Beobachtung an Kreichtieren" (Suggestions for using the school TV program "Observing Reptiles")
Biologie in der Schule, 31, 1982, No. 10, pp. 434-435.

A project to study the impact of the above cited TV program in 20 selected schools has made it possible to produce methodological instructions for this purpose. The structure of the program should always be taken into account. The author also describes what the pupils found most interesting in the program and the questions they asked after its completion.

instruction + biology, instruction medium, television, study project - 147311.

358. SCHUBERT, F.:
Hinweise zur Unterrichtssendung des Fernsehens "Fische in ihrer Umwelt" (Suggestions for using the school TV program "Fish in their Environment")
Biologie in der Schule, 31, 1982, No. 9, pp. 383-385.

The outcome of a study project carried out in 15 selected classes is reported on in the article; the findings have been summed up in the form of methodological instructions. The author first describes the structure of the program and the opportunities it provides, as well as the facts which the pupils considered to be most interesting and the questions they most often asked.

instruction + biology, instruction medium, television, study project - 147311.

359. SCHUBERT, F.:
Hinweise zur Unterrichtssendung des Fernsehens "Über das Verhalten der Vögel" (Suggestions for using the school TV program "On the Behaviour of Birds") Biologie in der Schule, 31, 1982, No. 11, p. 471.

On the basis of a study project carried out in 16 selected classes the author provides methodological recommendations concerning the use of the TV program cited in the title. He also describes the opinions of pupils concerning the program and the questions most frequently asked by pupils.

instruction + biology, instruction media, television, study project - 147311.

360. SCHUBERT, F.:
Hinweise zur Unterrichtssendung des Fernsehens "Was kennseichnet Säugetiere ?" (Suggestions for using the school TV program "What Characterises Mammals ?") Biologie in der Schule, 31, 1982, No.12, pp. 528 -529.

The article continues in a series which so far has been devoted to reptiles, fish and birds. It provides methodological instructions concerning the use of the program in classwork which are based on the outcome of a study project carried out in 16 selected classes. The author also describes the reaction of pupils to the program and the questions they most often asked.

instruction + biology, instruction medium, television, study project - 147311.

361. SCHUBERT, F.:
Schulfernsehen und Schulfunk im Schuljahr 1982-1983
(School television and school radio programs in the school-year 1982-1983)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 327-330. 3 tabs.

Television programs devoted to biology instruction are very popular. Radio programs contribute both to developing pupils interests and implementing elements of communist education. They mostly concern various aspects of ideology and worldview which are important from the point of view of biology. The survey the author provides concerns the television and radio broadcasts for biology which are being prepared for the school year 1982-1983.

instruction + biology, instruction medium, television, radio, program - 147311.

362. ZHUKOVA, E.S.:
Plan televizionnikh peredach na 1982-1983 uchebniy god
(A plan of television programs for the school year 1982-1983)
Biologiya v shkole, 56, 1982, No. 5, pp. 40-41. 1 tab.

The article provides a survey of the programs concerning biology instruction which will be broadcast by Soviet television in the next academic year. They include programs concerning general natural sciences in the 2nd to 4th classes, botany in the 5th and 6th class, zoology in the 7th class, anatomy, physiology and human hygiene in the 8th class and general biology in the 9th and 10th classes.

instruction + biology, instruction medium, television, program - 147311.

363. ALTMANN, A.:
Systematický obraz v biologii (Systematic pictures in biology)
Učební pomůcky ve škole a osvětě, 21, 1982, No. 10, pp. 156-158. 5 figs.

In view of the low number of biology lessons available in general education secondary schools (2 weekly lessons) it is difficult to work extensively with original objects or to systematically use activating methods in classwork, such as observations and experiments. For this reason frequently substitutes for original objects are increasingly used, among them the most important from the point of view of logical procedures (induction-deduction, analysis-synthesis, comparisons, generalizations) are wall pictures. For didactical reasons it is best to use them in combination with either live or mounted original objects in the sequence: original object - picture - term or notion. By modernizing pictures we now have magnetograms, which make it possible to show individual elements of an object in a desired sequence and to make maximum use of the element of novelty. With pictures it is easy to show foreign landscapes, protected natural objects, objects which are either too small or too large to examine naturally, the various stages of development of natural objects, their environment, as well as their simplifications on outlines. Systematic pictures have a special status, because they make it possible to compare and generalize. There are still too few of these pictures available. Their advantage is the possibility of forming basic terms concerning systematics. On the basis of an analysis, common characteristics of a selected groups of animals are sought, on the basis of which it is then possible to define the notion of a specific systematic group. Systematic pictures already have a history of their own. Systematic pictures which showed a large number of organisms in a specific environment, which often was not entirely suitable for many of them, were proven to be unsuccessful and are no longer used. For this reason modern systematic pictures show organisms without their environment, or if an environment is shown, then only together with organisms which actually live in it. Later pictures which combined the morphological, anatomical, systematic and ecological aspects were developed, but of these "mixed pictures" only morphological and anatomical or ecological and systematic pictures are still used. Other types, which combine all 4 aspects, are no longer used.

instruction + biology, instruction medium, picture, picture + systematics - 147311.

364. VAŠKOVÁ, M.:

Nové učební pomůcky pro základy zemědělské výroby na gymnáziích (New teaching aids for the teaching subject Foundations of Agricultural Production, taught in general education secondary schools)
Učební pomůcky ve škole a osvětě, 31, 1981-1982, No. 6, p. 91.

The teaching subject Foundations of Production and an elective vocational subject, which also includes the technology of the given field, now has at its disposal new teaching aids. A series of pictures called Introduction to Farm Animal Breeding (by F. Burda) have been made available. The series contains 30 colour tables. Secondary agricultural schools, as well as general education secondary schools have received 2 sets of slides: Dairy Housing (by J. Čermák), Cattle Housing Sheds I and II (by J. Čermák), as well as two other series: a 35 picture colour slide series called Drying Fodder (by J. Maleř), and one on Silage and Hay Production (by J. Maleř). Another colour slide series deals with The Dairy Industry (Z. Pešta). A teaching aid called "A Hog Breeding Program" was developed by F. Plocek.

instruction + foundations of agricultural production, picture, slide series, slide - 147311.

10.733 Foils and transparencies

365. REUTER, C.:
Technische Hinweise zur Herstellung und Vervielfachung von Folien (Technical advice on the making and duplication of transparencies)
Biologie in der Schule, 31, 1982, No. 12, pp. 527-528.

Transparencies are very important for strengthening what has been learnt and for testing pupils. Such material as items found in newspapers, tables, surveys and pictures can all be made use of. The author describes the material needed for making transparencies and how they can be duplicated in a mechanical form and improved on.

instruction + biology, instruction medium, transparency - 147311.

10.74. Photographs, macro-photographs, micro-photographs

366. REUTER, C.:
Mikrofotos ohne Kamera (Micro-photographs without a camera)
Biologie in der Schule, 31, 1982, No. 2-3, pp. 104-107. 3 figs.

The author describes an instrument made by pupils in the 6th to 9th class, as well as the required tools and how to proceed. In conclusion he describes methods of seeing and developing the photographed objects.

instruction + biology, instruction medium, micro-photography - 147311.

367. WILLIAMS, G. - NYCKEL, J.:
Taking Photographs Up Close
The Science Teacher, 49, 1982, No. 5, p. 23-25. 3 figs.

Both authors are biology teachers, who also teach ecology and are interested in nature photography. In this article they provide detailed information on how to take protographs of natural objects at very short distance, both during the daytime or with the use of lighting. They describe and illustrate with sketches how the photographed object should be illuminated, so that details are plain on the photograph. The article is addressed above all to science teachers, but is also interesting for students interested in the natural sciences.

instruction + biology, instruction medium, macrophotography, secondary school - 147311.

10.75 Slides and slide series, projected microscopical specimens

368. ALTMANN, A.:
Chráněné druhy živočichů. Soubor diapozitivů pro výuku zoologie v 6. ročníku ZŠ (Protected species of fauna. A series of slides for zoology instruction in the 6th class of basic school).
Učební pomůcky ve škole a osvětě, 21, 1981-1982, No. 8, 4 photographs.

The national enterprise Komenium has produced a series of colour slides for the 6th class of basic school concerning protected species of animals, as well as nature conservation and environmental control. These problems now form an important component of science education. The curriculum and teaching syllabi used in all types of schools stress them, as well as the new zoology textbook for the 6th class. The set has one representative of insects, one of the Cyclostomata, 2 amphibians, 3 reptiles, 18 birds and 5 mammals. The photographs used on the slides are by J. Rys, the accompanying text was written by A. Altmann; it devotes attention to the problem of pestacides and other chemicals used in agriculture and their effect on food chains, food networks and the biomass.

instruction + biology, instruction medium, slides, nature conservation, basic school, 6th class - 147311.

369. ALTMANN, A.:
Živočichové lesa (Forest animals)
Učební pomůcky ve škole a osvětě, 21, 1981-1982, No. 8, back cover, 4 photographs.

The national enterprise Komenium has produced a set of colour slides for teaching science in the 8th class of special school. The set stresses the ecological aspect. It includes 10 species of our wildly living animals which are also in the 8th class science textbook for special schools. The animals include the wolf, fox, bear, deer, roe, boar, buzzard, hawk and owl. Each animal has 2 to 8 slides devoted to it and this makes it possible to use an analytical and synthesizing approach in class work. The slides are by the outstanding photographers of animals, J. Štochl and J. Rys. The commentary and methodological instructions for teachers were written by A. Altmann.

instruction + biology, instruction medium, slides, biota + forest - 147311.

370. SHILOV, V.P.:
Mikroproyektsiya na ekran (Micro-projections on a screen)
Biologiya v shkole, 56, 1982, No. 2, p. 39. 1 fig.

The article contains detailed instructions for projecting an image from a school microscope to a screen with the aid of a projector which is available in the majority of schools. This type of projection facilitates the work of the teacher who does not have to check up on each pupil whether he has found what should have been found under the microscope. An instructive picture of the projection arrangement is provided.

instruction + biology, instruction medium, microprojection - 147311.

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INFORMATION BULLETIN

THE DIDACTICS OF BIOLOGY

Selected Bibliography for 1982

part II

ARY – SECTIONAL INFORMATION CENTRE
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PRAGUE 1984

10.79 Rubber stamps, prints, photograms

371. BRETSCHNEIDER, J.:
Vorschläge zur Nutzung des Stempels "Realisierung der Erbinformation" (Suggestions for making use of rubber stamps "The implementation of genetic information")
Biologie in der Schule, 31, 1982, No. 10, pp. 413-415. 2 figs.

Pupils have difficulties in understanding the dynamic aspects of genetics. For this reason in 1980 schools received a rubber stamp called "The implementation of genetic information", which represents a specific cognitive model on the basis of which pupils learn about the structure and function of nucleic acids. The author provides various suggestions for using the rubber stamp in classwork.

instruction + general biology, genetics, instruction medium, rubber stamp - 147311.

10.80 Statistical rables, graphs, diagrams

372. HORNÍK, F.:
Možnosti použití teorie grafů v didaktice biologie
(The opportunity to use graph theory in the didactics of biology)
Přírodní vedy ve škole, 33, 1981-1982, No. 3, pp. 82-84. 7 figs., lit. 12.

Graph theory is a modern branch of mathematics. It has been developing in this country for already 60 years. The application of graph theory can be found in organic chemistry, physics, biology, economics, and recently also in general didactics and the didactics of individual teaching subjects. In the GDR and Poland graph theory is being used in the didactics of biology. The article describes the basic terms used in graph theory and demonstrates specific possibilities of its use in practical biology teaching. A graph is composed of knots and edges. On a plane the knots are shown as points (rings) and edges as line segments, arcs or broken lines which connect the knots. For the practical application of graphs in the didactics of biology the term degree of knot is introduced (the number of edges which enter a knot and come out of it), the length of the connection (the number of orientated edges connecting specific knots). In biology teaching so-called trees, networks (network graphs), finite orientated graphs and cycles can be considered. Orientated graphs can be used to plan instruction, to supervise its course and to facilitate decisions made by the teacher, as well as to test the results achieved by pupils. Orientated graphs, as well as matrixes can be a suitable medium for didactical analysis. They support a creative approach and make some decision processes easier, as well as the supervision of pupils in the cognitive process.

instruction + biology, theory + graph, didactics of biology - 147311.

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10.83 Textbooks, methodological handbooks

373. BAER, H.W. - KUMMER, G.:
Lehrbuch und Unterrichtshilfen Biologie Klase 8 zum 1. September neu (A new textbook and methodological handbook for biology in the 8th class i being introduced on September 1st.)
Biologie in der Schule, 31, 1982, No. 6, pp. 238-242.

Among the main reasons for publishing a new textbook and handbook is the fact that existing experience indicates the possibility of improving the utilization of the time available for class work by stressing only important and essential things, and taking into consideration new scientific findings in biology to a greater extent. Also such topics as hygiene, a healthy life style, nature conservation and environmental contol require greater stress. The author describes in detail the new textbook and handbook.

instruction + biology, instruction medium, textbook, methodological handbook, 8th class - 147311.

374. HORNÍK, F.:
Nová učebnice pro fakultativní výuku biologie v NDR (A new textbook for the elective biology course in the GDR.)
Přírodní vědy ve škole, 33, 1981-1982, No. 1, pp. 10-11.

In general education secondary schools in the GDR in the 9th and 10th classes 2 lessons a week and in the 11th and 12th classes 4 lessons a week are devoted to an elective course in biology. For these courses a new textbook by E. Zabel et al. has been published, called "Nutzung und Schutz der Umwelt". The author analyses the textbook and discusses its use in elective biology courses in general education secondary schools.

instruction + biology, secondary school, textbook, elective courses, GDR - 147311.

375. MICHAJŁOW, W.:
Uwagi w spawie "Oceny podrecznika biologii dla klasy IV LO (Comments on the article "An Assessment of a Biology Textbook for the 4th Class of General Education Secondary Schools")
Biologia w szkole, 35, 1982, No. 3, pp. 188-190.

One of the authors of a biology textbook for the 4th class of general education secondary schools here answers some of the critical remarks written by A. Putrament from the Warsaw Institute of Genetics about this textbook. He stresses that some of the criticism is not valid when we know that a secondary school textbook is being assessed. The author accepts the criticism of some of the book's drawbacks and points out that some of the responsibility for the faults found in the textbook is with the authors of the teaching syllabus for which the textbook was written. He recommends extending the team of authors with specialists in genetics, who would be able to deal with some of the problem sections in the textbook in its next edition.

instruction + biology, secondary school, genetics, biology textbook, criticism - 147311.

376. PALKA, L. - SZYLARSKA, E.:
Badania nad wdrażaniem podręcznika dla ucznikow klasy VI. (Comments on the introduction of a new biology textbook for pupils in the 6th class)
Biologia w szkole, 35, 1982, No. 4, pp. 235-242.

A project to study the effect of the introduction of a new biology textbook in the 6th class was carried out in 1980-1981, within the framework of a wider research project organized by the Ministry of Education. The study was carried out by the staff of the Institute for the Didactics of Biology in Krakow and the Institute of School Curricula and Syllabi in Warsaw. The textbook studied was written by a team of authors; it was first tested at 19 experimental schools in various regions of the country. In the final part of the article the authors come to conclusion that the textbook is fully acceptable and of good quality.

instruction + biology, instruction medium, textbook, 6th class, basic school, study project - 147311.

377. PUTRAMENT, A.:
Ocena podręcznika biologii dla klasy IV LO
(An assessment of the biology textbook for the 4th class of general education secondary schools)
Biologia w szkole, 35, 1982, No. 3, pp. 186-188.

The author criticises and assesses a new biology textbook for the 4th class of general education secondary schools. Its author is W. Michajłowa and it was published in 1977. The author criticises the textbook because of its chaotic nature, especially in the 1st and 2nd part, too much information, which is essentially obsolete, incorrect, poor or inadequate definitions, redundancy, etc. The author assesses the book from the point of view of a geneticist, not someone working in the school system. The author is on the staff of the Warsaw Institute of Genetics.

instruction + biology, instruction medium, secondary school, genetics, 4th class, criticism - 147311.

378. WRIGHT, J.D.:

The Effect of Reduced Readability Text Materials on Comprehension and Biology Achievement

Science Education, 66, 1982, No. 1, pp. 3-13.

Biology textbooks for secondary schools are often written in a way which makes them difficult to comprehend by students. Not only is their style often too concise, but the text includes technical and difficult terminology, long sentences and often large numbers of tables, graphs, diagrams, etc. If students are to understand these texts, read them and understand their content, they must exert a great deal of energy, which might better be used otherwise. The author studied and compared a number of textbooks and then made a comparative study of them with 265 students in the 9th and 10th classes. In the article the author reports on her findings: 67 % of the students studied said they had difficulty in understanding these textbooks; they are not readable and hence difficult to understand.

instruction + biology, instruction medium, textbook, criticism - 147311.

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10.85 Worksheets, workbooks, didactical tests, questionnairs, didactical cross-word puzzles, didactical games, etc.

379. BARABAS, U.:
Rätselaufgaben - ein Unterrichtsmittel zur Festigung und Anwendung biologischer Kenntnisse (A cross-word puzzle as an instruction medium for the strengthening and application of knowledge in biology)
Biologie in der Schule, 31, 1982, No. 9, pp. 355-356.
2 figs.

Many authors have already pointed out the advantages of cross-word puzzles. The author here describes a whole system of cross-word puzzles which are related to the subject-matter taught in 7th class biology. She describes her own experiences with their use in class and cites two examples.

instruction + biology, instruction medium, 7th class, cross-word puzzle - 147311.

380. CICHY, D.:
Efektywność gier dydaktycznych w nauczaniu biologii
(The effectiveness of didactical games in biology instruction)
Biologia w szkole, 35, 1982, No. 2, pp. 82-88. Lit. 8, tab. 5, 2 figs.

The author, who is a specialist in the didactics of biology, here provides a detailed report on a study project to determine the use of didactical games in schools. In biology instruction, especially games based on logical procedures (such as cross-word puzzles or word games), panel discussions with groups of pupils, simulation games (different pupils take on the roles of different professions, such as a zoologist, farming engineer or farm-animal breeder)and picture puzzles, etc. can be used. The project reported on indicated that pupils in experimental classes achieved markedly better results than those in the contol classes; they demonstrated a higher interest in biology, better and more permanent knowledge, etc. The author also reports on the opinions expressed by teachers as far as didactical games are concerned. The majority expressed a positive attitude and said the game they use most often are cross-word puzzles. Much depends on how the game is used in the teaching lesson.

instruction + biology, instruction medium, didactical games - 147311.

381. DŁUGOWIEJSKA, J. - STAWIŃSKI, W. - ZEBALSKA, E.: Test z biologii dla klasy VI. (A biology test for the 6th class)
Biologia w szkole, 35, 1982, No. 4, pp. 213-218.
22 figs.

This didactical test deals with the Thyllophyta and Tracheophyta. The test has 2 versions, with 23 questions each. The questions are multiple-choice and provide 4 alternatives. Both versions of the text have a total of 22 pictures.

instruction + biology, instruction medium, didactical test, 6th class, basic school - 147311.

382. GERLACH, M.:
Arbeitsblätter zur rationellen Nutzung des Schulfernsehens (Worksheets to make the watching of school television programs more rational)
Biologie in der Schule, 31, 1982, No. 11, pp. 472-473.

In a making use of TV programs in the course of instruction it is often difficult to decide what purpose the program should serve. To solve this problem the author uses worksheets and describes his experiences with them in the 10th class. Each worksheet contains a survey of the program and a time schedule; the author describes a worksheet on the subject "What are mutations" and how he used it in class work.

instruction + biology, instruction medium, didactical test, television, secondary school, 10th class - 147311.

383. HISZPAŃSKA, B.:
Test z biologii dla klasy VI. (A biology test for the 6th class)
Biologia w szkole, 35, 1982, No. 4, pp. 209-213.
14 figs.

The author describes a didactical biology test based on the teaching syllabus and textbook for the 6th class. The test has two versions to prevent pupils from copying and contains multiple choice answers. Each version contains 20 question.

instruction + biology, instruction medium, didactical test, 6th class, basic school, zoology - 147311.

384. MAKARA, S.:
Rozrywki umysłowe (Mental recreation)
Biologia w szkole, 35, 1982, No. 2, pp. 115-119, Lit. 11, 8 cross-word puzzles.

Cross-word puzzles were popular already in ancient Greece. The first known Polish cross-word puzzles come from 1406. Now more modern ones are used and a number of different types exist. In 1963 an All-Polish Congress on Cross-Word Puzzles was convened. Cross-words can also be used in school lessons, as a number of authors have pointed out. The author cites 8 different examples of cross-word puzzles suitable for biology instruction. When doing them it is best to read all the definitions, write in those words where we are sure of the answer and then try to guess those expressions where at least some of the letters are known.

instruction + biology, instruction medium, cross-word puzzle, didactical game - 147311.

385. MÜLLER, A. - WINDELBAND, A.:
Vorschläge für Arbeitsblätter schöpferischer Lerntätigkeit in den Klassen 5 und 6 (Suggestions for worksheets to support creative learning activities in the 5th and 6th classes)
Biologie in der Schule, 31, 1982, No. 10, pp. 403-409.

Worksheets provide the teacher with an opportunity to supervise the cognitive process in pupils and to plan an individual approach to each pupil. The systematic guidance of pupils towards problem situations makes it possible to distinguish three alternative types of worksheets: 1) worksheets in which a pupil must independently formulate a problem; 2) worksheets which are an indirect instruction for dealing with a problem and

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3) worksheets which require the independent formulation and solution of a problem. The author also cites examples of how he uses all three types of worksheets in the 5th and 6th classes in the biology course.

instruction + biology, instruction medium, 5th class, 6th class, worksheet - 147311.

10.86 Atlases, keys and punch cards to determine natural objects

386. ANDĚRA, M.:
Klíč k určování našich savců - Kopytníci (A key to identifying our mammals - Ungalates)
ABC mladých techniků a přírodopisců, 26, 1982, No. 21, pp. 18-19. 4 photos, 1 fig.

This key provides characteristics of the Ungulates and comments on their morphology. On the basis of suitable diacritical signs it provides the key to identifying 9 species of even-toed ruminants of the Bovidae and Cervidae. The key is suitable for pupils' independent work, for practical excercises and for hobby clubs both in basic and secondary school.

instruction + biology, instruction medium, identification key, zoology - 147311.

387. ANDĚRA, M.:
Klíč k určování našich savců - Letouni (A key to identifying our mammals - Chiroptera)
ABC mladých techniků a přírodovědců, 26, 1982, No. 22, p. 18, 3 photos, 1 fig.

The key first deals with general characteristics of Chiroptera and their basic morphological characteristics; it also acquaints the reader with basic terms which are needed for the identification of this family, which includes the Rhinolophidae and the Microchiroptera. The key to the former, which includes 3 species is described in detail. The key can be used in class work, in practical excercises and also in hobby club activities both in basic and secondary schools.

instruction + biology, instruction medium, identification key, zoology - 147311.

388. ANDĚRA, M.:
Klíč k určování našich savců - Letouni (A key to identifying our mammals - Chiroptera)
ABC mladých techniků a přírodopisců, 26, 1982, No. 23, pp. 18-19. 2 photos, 1 fig.

This key deals with the Microchiroptera and allows the reader to identify 22 species of this mammal. The key is supplemented by information concerning various species of bats, and is suitable for class work, practical excercises and hobby club activities.

instruction + biology, instruction medium, identification key, zoology - 147311.

389. DEGTYAREVA, V.K.:
Premenenie perfokart dlya opredeleniya nasekomikh vo vremya ekskursii (The use of punch cards for the identification of insects during an excursion)
Biologiya v shkole, 56, 1982, No. 4, pp. 58-60. 3 figs.

The author provides instructions for the use of punch cards for the identification of insects during an outdoor excursion organized within the framework of an elective subject called Nature conservation, where work concentrates on natural communities (such as meadow or forest). Extracurricula work concerns zoology and local fauna; especially insects are studied. Pupils become acquainted both with insect pests and with useful insects which destroy the larvae and pupa of insect pests. The author provides instruction on the making of punch cards (which contain a special insect identification key), as well as on the preparations and carrying out of the excursion. Of course the punch cards contain only insects which are usually found in the close vicinity of the school. The author used her punch cards at a school in Gdovsk, in the Islovskaya region.

instruction + biology, excursion, instruction medium, identification key, punch card, zoology - 147311.

390. JANIN, C.L.:
La classificazione (Classification)
Scuola e didattica, 26, 1980-1981, No. 2, pp. 36-37.

Didactical recommendations on how to introduce students to a very difficult task: the classification of species. On duplicated sheets on which lists of selected animals are written, students are asked to fill in their various characteristics; they have 3 to 4 hours for this task. Another possibility are cards which students keep and throughout the year records on them the characteristics of various animals as they learn about them. Still another alternative are so-called scientific workbooks, divided according to the alphabet, into which students write various animals together with a classification index. The author cites other methods of classwork and stresses the need to link this work with the use of the textbook.

instruction + biology, classification, zoology - 147311.

391. SCHMIDT, E.:
Tierbestimmen unter functionalen Aspekt an Hirschen in Tierpark und Museum (Identifying animals from a functional point of view on the basis of deer in the zoo and museum)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 12, pp. 437-443. Lit. 22, 8 figs., 3 worksheets.

For identifying the Cervidae in a zoo or museum the author has drawn up a dichotomic key, which makes it possible to identify 7 species: the European deer, European elk, the Polar reindeer, the Fallow deer, the Sika deer, the Roebuck and the Axis deer. The antlers and colour of the animal are the most important diacritical characteristics. During an excursion to the zoo or museum pupils can learn to distinguish these species on their own.

instruction + biology, excursion, zoological garden, museum, identification key - 147311.

10.88 Popular science literature and periodicals

392. STETINA, T.:
Zemlya u nas tolko odna (We have only one Earth)
Biologiya v shkole, 56, 1982, No. 6, pp. 76-79.

In several years the pupils of basic schools will have graduated from school and become active in work. They should therefore become acquainted with the foundations of agricultural output as well as with nature conservation. In this context popular scientific literature is of great importance for basic school pupils. In 1982, in the city of Baku the Government Committee for Children's Literature of the Goskomizdat SSSR met to discuss problems connected with the publication of popular science books for young people from the point of view of the documents of the 26th Congress of the Communist Party of the Soviet Union. Writers of children's literature from all the Union republics participated, as well as the staff of the Childrens' Publishing House of the RSFSR, the Veselka Publishers from the Ukranian SSR and others. Among the most important topics discussed were the publication of science books for children, especially about nature and the contribution made by various authors to this subject-matter.

instruction + biology, literature for youth - 147311.

10.92 Instruments and aids for experiments with natural objects, kymographs

393. CONSTANTINOU, C.:
A Simple Activity Cage for Studying Circadian Rhythm
Journal of Biological Education, 16, 1982, No. 1,
pp. 16-17. 1 fig.

The author describes the construction of a simple cage which can be used to study the locomotive activity of insects and other arthropoda. The cage can be made in the school workshop; changes can be introduced in its size to fit various kinds of insects and it replaces much more expensive instruments. Observations can take place for long period of time, because food and water can be put in the cage and with the aid of a RH solution the humidity of the air can be regulated.

instruction + biology, zoology, arthropoda, instruction medium, facility, observation - 147311.

394. GUILBERT, G.:
The Carriage of Oxygen by Blood
Journal of Biological Education, 16, 1982, No. 1, p. 18-21.
3 figs., 1 tab.

The carriage of blood by the blood stream can be simulated and demonstrated for pupils with the aid of a simple respirometer composed of glass components, made according to a sketch provided by the author who also describes in detail the whole apparatus and experiment. The author has tested this method during several years of practical classwork, including recipes for the liquid used. The components of the apparatus are easily available in shops which supply laboratory glassware.

instruction + human biology, blood circulation, simulation, apparatus, experiment, observation - 147311.

395. LOCK, R. - WOOD-ROBINSON, C.:
Kymographs, stimulators, and kymographs with stimulators
Journal of Biological Education, 16, 1982, No. 4,
pp. 231-234. 3 figs., 2 tabs.

The authors provide a table with technical data concerning three new models of kymographs, sold under the tradenames Bioscience UK, Griffin and Harris. Their functions are described in detail, as well as the differences in their design and accessories. The article is addressed to teachers in the UK, who after acquainting pupils with these instruments can use them to demonstrate heart and nerve activities on the basis of live material. The price of the kymographs is between 245 and 402 pounds sterling, the stimulators cost between 69 and 113 pounds sterling.

instruction + biology, instrument + experiment, observation, physiology - 147311.

396. STORRER, J. - KÖLCH, A.:
Anhang (A supplement)
Praxis der Naturwissenschaften - Biologie, 31, 1982,
No. 9, pp. 274-278. 3 figs.

A supplementary chapter which in comprehensible form describes the characteristics and functional principles of amplifiers and oscillographs, as well as various other information on electro-physiology (including various data, addresses of firms and recipes). Technical data concerns diffirential amplifiers, the theory of amplifiers, the registration instrument used with them, the servicing of oscillographs, factors important for the creation of a electron ray and the amplification and deviation of the ray in the direction of the y axis.

instruction + biology, physiology + eletricity, instrument - 147311.

397. WYMER, P.E.O.:
The Use of the Chemostat in School Biology
Journal of Biological Education, 15, 1981, No. 4,
pp. 259-262. 2 figs., 2 tabs.

A chemostat has become a necessity in biological and biochemical research. It is expensive but in school it can be made in a simple manner and at a much smaller expense if special microbial cultures are used in the experiments. The author describes an home-made chemostat and provides a drawing of its design. Descriptions of its use in experiments are also provided. Tables sum up the names of microorganisms which can be used in school work. Specifically, the author recommends the use of the blue-green algae Anabaena variabilis and the green algae Selenastrum gracile as best for beginner work with a chemostat.

instruction + biology, research + biology, bio-chemistry, instrument + experiment, microorganism - 147311.

10.95 Instruments for making images and reproducing sound, projectors, episcopes, epidiascopes, slide projectors, overhead projectors, tape recorders and decks, radio sets, phonographs, radio-phonographs, combined projection facilities, control panels

398. HOMOLA, V.:
Zařízení k vybavení učeben didaktickou technikou
(Furnishings for equipping classrooms with didactical technology)
Učební pomůcky ve škole a osvětě, 21, 1982, No. 5, pp. 79-80.

The national enterprise Komenium in Prague has begun to produce in small series two components which make it easier to install and control various systems of didactical technology. The control panel DT concentrates the switches and regulation of all instruments used in the classroom (including a slide projector, projectors of the Meoclub series, an eletrically controlled screen and windowshades. The panel also controls all reproduction systems in the classroom and their volume. The other item is a movable arm for permanently installed projectors, especially for film projectors.

instruction medium, didactical technology, slide projektor - 147311.

399. MEZÍRKA, P.:
Ošetřování gramofonových desek (Taking care of gramophone records)
Učební pomůcky ve škole a osvětě, 21, 1981-1982, No. 2, p. 25.

Gramophone records can be irreversibly and permanently damaged when the pick-up is not placed on the record correctly, by the use of poor or worn needles, by using a mono needle on a stereo record, by grime on the record and by touching the record on the grooves (grease from the fingers then attracts larger quantities of dust). This can be prevented by keeping the records in their original covers, by cleaning them either with a velvet cloth or with a fine brush. Records must never be stored in the vicinity of a heat source and should be stored in a vertical position. Storing records of different sizes next to each other can lead to their deformation.

instruction medium, gramophone records - 147311.

10.96 Optical instruments, magnifying glasses, mounting magnifiers, microscopes, exposure meters, cameras, stereomicroscopes

400. FORD, B.J.:
The Nucleus and the Simple Microscope
Journal of Biological Education, 16, 1982, No. 4,
pp. 281-285. 9 figs.

The term "nucleus" was introduced by the British scientist Robert Brown 150 years ago. He was a member of the Royal Society and at the beginning of the first decade of the last century he described over 1700 contemporary and fossile species of flora and fauna. Later he concentrated on microscopy and with the aid of a simple microscope he made a number of significant discoveries (the Brown movement of molecules, the structure of the cell). His discoveries are comparable with the outcome of studies which use the most modern microscopes. This commemoration of Brown can be illustrated with original microscopes which magnify 170 x and with microphotographs made on them.

instruction medium + biology, microscope, history -
147311.

401. ŠLÉGL, J.:
Mnohostranné využití stereomikroskopu MST 131 ve školní praxi (The variable utilisation of the stereomicroscope MST-131 in classwork)
Přírodní vědy ve škole, 33, 1981-1982, No. 2, pp. 50-51.
2 photos

The stereomicroscope MST - 131 made by Labimex in Warsaw is imported to Czechoslovakia for use in

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schools. Its binocular head has eyepieces which magnify 6.3 x or 25 x. The microscope objectives are changed by merely moving the adjustment knob and they magnify 0.63 x, 1 x, 1.6 x, 2.5 x and 4 x. The scope of magnification is 4 to 100 x; the size of the viewing field 44 to 2 mm. The instrument can be used for the observation of transparent and opaque objects in human biology, general biology, botany, zoology, geology, chemistry, physics and the foundations of agriculture. It is supplied by Labora, Prague.

instruction medium, microscope - 147311.

10.97 Areas devoted to instruction and to the storage of aids - biology workrooms, biology laboratories, biology storage rooms

402. ANANYEVA, G.I.:
Iz opita ispolsovaniya obrudovaniya kabineta biologii
(Experiences with the use of the objects found in the biology storage room)
Biologiya v shkole, 56, 1982, No. 4, pp. 55-56.

The author describes all the media found in biology storage rooms in schools and on the basis of examples shows specific uses to which the available media can be put.

instruction + biology, storage room + biology, instruction medium - 147311.

403. RAFFAČOVÁ, M.:
Skúsenosti z vyučovania prírodovedy v špeciálnej triede
(Experiences with biology teaching in a special class)
Komenský, 106, 1981-1982, No. 5, pp. 275-276.

Nature science studies in the 4th and 5th class of basic school develop the pupil´s abilities to work independently and to understand natural phenomena. This teaching is based on practical activities and thus it leads in an unobtrusive manner to developing iniciative, an aesthetical feeling and to the development of individual interests. The purpose of the instruction is to show that nature is a constantly changing entity. It thus contributes to the pupils´ education and the forming of a scientific worldview. This of course requires demanding methods of instruction and carrying out observations and experiments. The author describes how the theoretical knowledge which pupils have gained in class can be extended during outdoor excursions in the spring and autumn. The pupils collected samples of plants, which were pressed, etc. The Pedagogical Centre in Košice organises the further education of science teachers from basic schools and publishes methodological sheets containing various information on work outdoors and in living-nature rooms in schools; it also provides consultations concerning the use of experiments in classwork. Also the making and use of various nature bulletin boards and small exhibitions in the nature study classroom are discussed.

instruction + natural sciences, classroom + science, instruction media, bulletin boards - 147311.

404. STEPANOV, V.I. - MIRCHEVSKAYA, L.B. - AKULINIRSA, A.S.:

O racionalnom planirovanii uchebnikh pomeshcheniy i uchebnoopitnoy zoni shkol (On the rational planning of individual classrooms and places where experiments and teaching take place)

Biologiya v shkole, 56, 1982, No. 4, pp. 50-55. 5 figs.

If the effectiveness of biology instruction is to be improved then it is necessary to form an adequate foundation in the furnishings of classrooms, laboratories, experimental and breeding facilities within schools, etc. The central research institute for the design of typified and experimental school buildings, in cooperation with the Ministry of Public Health has now developed design projects for the furnishings and lay-out of classrooms. The article specifically deals with classrooms for biology instruction, including storage rooms, biological laboratories and the necessary laboratory apparatus. The project also includes the design, furnishings and lay-out of rooms for biology hobby clubs, as well as school experimental gardens and orchards, which should have a total area of 2100 m^2 including the following: for garden and field crops 300 m^2; for fruit trees 500 m^2; 400 m^2 for a hothouse; 80 m^2 for selection and breeding work, etc.

instruction + biology, instruction media, classroom + biology, laboratory + biology, school experimental plot of land - 147311.

11. Organisational forms of biology instruction

11.21 Laboratory work

405. KLEIN, S.E. et al.:
The Laboratory is Vital in Science Instruction in Secondary School
The Science Teacher, 48, 1982, No. 2m pp. 20-23.

The National Association of Science Teachers in the USA has again stressed the importance of and need for teaching biology through laboratory work. The authors here discuss the role of laboratory work in schools of various types and levels. They also provide an outline of a future science curriculum which would include research which could be done by schools if they had adequately equipped laboratories and enough money to buy the needed material. The authors also discuss the teaching syllabus for a "creation science" course, whicm the Association has, however, repeatedly rejected, in spite of endeavours to renew it.

instruction + biology, organizational form, laboratory excercises, USA - 147313.

406. PFEIL, H.:
Die Kartoffel - ein wichtiges Nahrungsmittel
(Potatoes - an important source of nutrition)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 12, p. 444.

Potatoes are propagated in a vegetative manner, as tubers producing shoots. They can also be reproduced in a sexual manner, by berries with seeds. In temperate climates potatoes together with bread are the main food.

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Approximately 66 % of the crop is used as human food, 13 % for planting new crops and 6 % as raw material for making starch and alcohol; the remainder is used as fodder. Potatoes originated in South America; the author describes how they came to Europe and became widespread. Also three experiments with potatoes are described: in the first the water content of a tuber is determined, in the second the presence of starch and in the third, grains of starch are observed under the microscope. A table contains the calory content of potatoes in various manners of serving them (potatoes fried in bacon drippings have the highest calory value - 846 kJ, while cooked potatoes only 176 kJ). Another table cites vitamin losses of the B group and vitamin C which occur in various forms of cooking potatoes. The largest amount of vitamin B is lost when potatoes are made into dumplings (85%) and the same is true of vitamin C. Potatoes have a very favourable mineral composition, with a predominance of alkaline-forming substances (elements); hence in food they act against the forming of uric acid in the body and thus against gout, rheumatism, swellings and high blood pressure. The high potassium content of potatoes also causes the kidneys to exclude a large quantity of urine. If potatoes are highly salted they, however, lose these qualities.

instruction + biology, organisational form, laboratory work, tuber crops - 147313.

407. SCHROCK, G.F.:

A Laboratory Excercise to Assess Transpiration

The American Biology Teacher, 44, 1982, No. 4, p. 242-245 and 252, 4 figs., 2 tabs.

Textbooks deal with the existence of permanent transpiration, but usually do not include a excercise which would demonstrate its immediate effect. The author has designed and tested several such excercises. One is based on observations of the Sunflower (Helianthus annuus unnuus L.). The outcome of the experiment is summed up in a table.

instruction + biology, physiology + plants, laboratory excercise, transpiration - 147313.

408. STEPHENSON, S.L.:

Slime Molds in the Laboratory

The American Biology Teacher, 44, 1982, No. 2, pp. 119-120 and 127. 3 figs.

Slime moulds (Myxomycetes) are an interesting subject of study. There are over 450 species and they are a very widespread group of organisms, which not only have some of the characteristics of plants, but also some of animals. Usually Physarum polycephalum is used in school laboratories in spite of the fact that there are many other species which can easily be found outdoors, for instance Trichia favodinea, Stemonitis axifera, Metatrichia vesparium and others. The author describes how to collect slime moulds outdoors, especially in damp forests where rotting wood can be found. Also instructions on how to cultivate them in the laboratory are described, as well as for their observation with a microscope and photography. In view of the large number of slimes which exist the author stresses that high school students might discover new species and contribute to the more detailed knowledge of this group of organisms.

instruction + biology, organizational form, laboratory work, botany - 147313.

409. TAMIR-NUSSINOVITZ - FRIEDLER:

The Design and Use of a Practical Test Assessment Inventory

Journal of Biological Education, 16, 1982, No. 1, pp. 42-5o. 3 tabs.

Laboratory work is an important component of biology instruction. To improve students´ performance the authors have designed various practical tests which are described, as well as examples of using these tests in a secondary school in Israel. Practical excercises include determining the quantity of glucose in carrots and others which are summed up in tables. In conclusion other advantages of the testing system are summed up by the authors; they stress the objective cognition of biological phenomena.

instruction + biology organizational form, laboratory work - 147313.

410.

THOMSON, R.G.:

Sweet Tooth Exposé - The Snyder Test

The Science Teacher, 48, No. 2, pp. 30-31, 3 tab.

The Snyder test and its application in class can increase students´ interest in biology instruction. This test shows a patients´ propensity to develop tooth caries. It is based on the fact that bacteria found in the oral cavity metabolize sugar and during this process acids develop which damage tooth enamel; thid in turn leads to caries. People who eat too much sugar in their food tend to have very high Snyder test figures and have a higher tooth decay risk. The author describes the experiment which includes calometric measurements on the basis of a method developed by the Difco laboratories in the USA. This interesting experiment is suitable for use in the upper classes of general education secondary schools.

instruction + biology, lanoratory excercise, human biology, experiment - 147313.

411. WEBER, R.:
Kartoffeln als Untersuchungs-Gegenstand und Hilfsmittel im Biologieunterricht (Potatoes as an object of study and an instruction medium)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 3, pp. 94-102. 2 photos, tab. 8.

The author describes approximately 50 different observations and experiments which can be undertaken with potatoes and without the need for too many instruments or apparatus. The experiments are described in detail and assessed. The majority are for demonstration purposes, for pupils between the ages of 10 to 13 years. Other experiments are more suitable for biology hobby clubs or for pupils in the 14 to 16 year age group. First the potato tuber is described in detail, the history of its cultivation and its morphology. The observations concern fertilization, the regulation of the tubers, experiments concerning osmosis, the composition of potatoes and the changes which occur in them when they are stored and cooked.

instruction + biology, organizational forms, laboratory work, botany - 147313.

412. WITTE, G.R.:
Umweltbelastungen im Freilandlabor. Freilanduntersuchungen mit Schülern des 5. Schuljahres (Placing a burden on the environment in an outdoor laboratory. Outdoor studies with pupils in the 5th class) Naturwissenschaften im Unterricht - Biologie, 31, 1982, No. 8, pp. 265-268. 5 figs., 1 tab., 7 worksheets, lit. 43.

The theoretical foundations of field work are here discussed on the basis of the example of an ecological study of water areas. All the problems discussed concentrate on a central objective - to acquaint pupils in the 5th class with the manner in which the environment is burdened. Instruction outdoors has a number of advantages - it is more interesting, work can be done in groups, pupils learn tolerance towards the work of the less capable, as well as mutual cooperation; also modern methods of teaching which concentrate on the independent work of pupils can be implemented. Essentially this a multi-sensory form of instruction where also an emotional impact on the pupil is assumed. Work groups are non-homogenous and internally differentiated and pupils learn by play. The author describes such a study project concerning a fish pond, its conditions of life, flora and fauna and how the fish pond is burdened by a polluted environment.

instruction + biology, organisational form, laboratory work, excursion, ecology - 147313.

10.22 Practical excercises in biology

413. DANIEL, T.F. - JOHNS, T.:

A Laboratory on Chemotaxonomy: The Systematic Distribution of Betalains

The American Biology Teacher, 44, 1982, No. 5, pp. 308-310 and 318. 2 figs., 1 tab.

Experimental chemotaxis is a relatively new field which requires synthetic knowledge of organic chemistry and plant systematics and also requires costly apparatus. For these reasons many teachers do not think themselves qualified sufficiently for this type of work. Also laboratories are usually not equipped for this type of work. The purpose of the present article is to introduce students to the problem of various types of chemical data which are used to identify systematic relations among plants. The excercises described by the authors are simple and provide very good results; also they do not require costly apparatus.

instruction + biology, practical excercise + biology, botany - 147313.

414. DURANDIN, A.I.:

K provedeniju prakticheskoy raboti "Dikhaniye semyan"

(On carrying out a practical excercise on seed respiration)

Biologiya v shkole, 56, 1982, No. 1, pp. 39-40, 1 fig.

The author describes a very interesting experiment which clearly demonstrates that when seeds germinate, they produce carbon dioxide in the process of respiration. The presence of carbon dioxide can be proven with the help of barium hydroxide. The measurement of the precise quantity of carbon dioxide requires titration. The experiment is suitable for practical excercises in botany. The article includes detailed instructions and a drawing of the arrangement of the apparatus.

instruction + biology, organizational form, biology practical excercises, experiment, botany, physiology, plant - 147313.

415. FISCHER, J.A.:

An Elementary Quantitative Examination of Sedimentary Deposits

The School Science Review, 64, 1982, No. 227, PP. 228--293. 8 figs.

The author describes a method for graphically representing and assessing an experiment where a sample of soil is used to study the forming of sedimentary deposits and assessing various aspects of new deposits in various types of material from clay to gravel. The outcome is assessed and graphically represented by a Gauss curve or by plotting the data on a logarithmic scale. The instructions for the excercise are provided in detail, as well as for collecting soil samples.

pedology, practical excercise, organisational form, experiment, graph - 147313.

416. GERARDINI, A.C.:

Etologia (Ethology)

Scuola e didattica, 26, 1980-1981, No. 15, pp. 59-60.

The behaviour of animals in a specific environment also has social aspects. Ethological studies include an analysis of the perception of animals, their interaction with the environment, intelligence, methods of communication (by colour, movement, dance, sound, etc.) and the environment in which the animals live. The author recommends including in this topic also the study of some animal which lives in the vicinity of the school, for instance some bird, whose behaviour can be observed, described, analysed and a model of its behaviour in relation to the environent drawn up.

instruction + biology, ethology, biological practical excercise, organizational form - 147313.

417. GERARDINI, A.C.:
Etologia II (Ethology II)
Scuola e didattica, 26, 1980-1981, No. 16, pp. 65-66.

The social life of animals can be explained for instance on the basis of the example of seasonal movements of flocks of birds. The process of forming a flock can serve as the theoretical basis for explaining factors which influence the social life of animals. Practical excercises for this topic can be carried out during excursions, also for instance by observing the life of ants in an ant hill.
instruction + biology, organisational form, biological practical excercise, excursion, observation, insects - 147313.

418. GERARDINI, A.C.:
Etologia III (Ethology III)
Scuologa e didattica, 26, 1980-1981, No. 17, pp. 57-58.

This chapter concerns the life of animals in families. The author explains the structure and function of animal families, their basic types (a maternal family, paternal family, parent family) and other social groups. In conclusion he refers to specialized literatura concerning ethology, where he provides a bibliography.

instruction + biology, organizational form, practical excercise, ethology - 147313.

419. HÁJKOVÁ, E.:
Zjišťování tělesné obesity (Determining body obesity)
Přírodní vědy ve škole, 33, 1981-1982, No. 4, pp. 128-131. 1 fig. 4 graphs., 3 tabs., lit. 9.

In the teaching syllabus for the 4th class of general education secondary schools the topic "The Motor and Supporting Body System" assumes a practical excercise. The author, who is a secondary school teacher, recommends including the determination of obesity as a part of this excercise. From a subject-matter point of view this topic can also be included into the topic Matter and Energy Metabolism. In the period of the scientific and technological revolution obesity is becoming a worlwide problem and it is now considered to be a disease. Body weight is one of the indicators of a person's state of health. Decisive in this context is the composition of the body, the relation between active weight and deposited fat. In a healthy person fat tissues represent only 10% of total body weight; in men figures up to 20 % and in women 25 % are still considered to be normal, but a higher percentage indicates a degree of obesity. The author discusses the causes of obesity and methods of treating it, and provides suggestions for a biological practical excercise called Body Weight, Share of Fat and Active Body Weight. In the excercise, skin folds are measured in 10 places on the body, as well other indicators and comparisons are made between those active in sports and those who are not.

instruction + biology, organisational form, practical excercise, human biology, experiment, observation, obesity - 147313.

420. JANIN, C.L.:
La reprodusione I (Reproduction I.)
Scuola e didattica, 26, 1980-1981, No. 16, pp. 30-31.

The author provides a survey of the theory of reproduction and how it should be taught in school. Maintaining the life of the species can be explained on the basis of experiments and observations, as well as by using a microscope as far as the more simple living organisms, such as bacteria, algae, yeast and mold are concerned.

instruction + biology, reproduction + organism, organizational form, instruction method, observation, experiment, practical excercise - 147313.

421. JANIN, C.L.:
La reprodusione II. (Reproduction II)
Scuola e didattica, 26, 1980-1981, No. 17, pp. 34-35.
3 figs.

The article deals with three stages of sexual reproduction on the basis of three examples: ferns (sporeous plants), gymnosperms and in the animal kingdom-insects. For all the examples the author describes ways of finding specimens outdoors and provides instructions on how to use the material for observatiems under a microscope and how to analyse the findings.

instruction + biology, general biology, botany, zoology, organisational form, instruction method, biology practical excercise - 147313.

422. JANIN, C.L.:

Risveglio primaverile dei vegetali: esperienze pratiche
(The spring awakening of plants - practical experiences)
Scuola e didattica, 26, 1980-1981, No. 15, p. 28. 3 figs.

This practical excercise includes observations of germinating seeds, measuring their increase in volume and weight, experiments with determining the output of carbon dioxide during germination and the absorption of water and oxygen during the growth of a plant.

instruction + botany, organisational form, biological practical excercises, observations, experiments, germination + seeds. growth stages - 147313.

423. JURČÁK, J.:

Pelargonie v praktických cvičeních z botaniky
(Geraniums in practical excercises in botany)
Přírodní vědy ve škole, 33, 1981-1982, No. 4, pp. 125-128.
20 microphotos.

Geraniums are among the most frequently cultivated potted plants and they can be utilised for microscopy studies in biology practical excercises. The author cites various examples of such work in basic school or in hobby clubs in basic school. The place of germaniums in plant systematics is described, as well as how they are cultivated and propagated. Instructions are provided for making microscopy specimens, for observing root tips, cutting of a primary root, primary stem, a stem in a secondary structure, the petiole of the leaf, the leaf blade and the petal. In a section on plant physiology, the author provides brief instructions for other practical work and observations.

instruction + biology,organisational form, practical excercise, botany,physiology + plant - 147313.

424. SANDS, M.K.:

Problems Raised by Teachers when Implementing a Scheme of Internal Assessment of Practical Work

Journal of Biological Education, 16, 1982, No. 2, p. 131, pp. 131-134.

Instructions have been issued by school authorities for the assessment of practical excercises done in science laboratories or outdoors, in the course of secondary school biology instruction. The author coolected opinions voiced by teachers concerning these instructions and here carries out their analysis and assessment. He provides comments and a description of some of the most pressing problems in this area, such as the number of practical excercises in the curriculum, when they should be started, how testing should be carried out, what standards to use, whether students should become acquainted with the outcome of assessments and what to do with students who are absent from a larger number of practical excercises.

instruction + biology, organizational form, biology practical excercises, assessment + student, standard - 147313.

425. SCHWARZ, E.:

Kann man Chlorofyll anstreichen ? Von didaktischem Wert des scheinbars Belanglosen (Can chlorophyll be used to paint with ? On the didactical value of seemingly trivial matters)

Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 6, pp. 221-224, 1 fig., lit. 5.

On the basis of an example, the author shows how seemingly trivial problems can become a good motivating factor and the point of departure for modern experimen-

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tal teaching. The problem is whether chlorophyll made from plants can be used as paint. First the pupils learn how to make chlorophyll from leaves. Frozen spinach can serve this purpose; from it an alcoholic solution of chlorophyll can be obtained. The project is suitable for the 10th class. The pupils learn how to formulate a hypothesis - in this case, chlorophyll can be used as paint. It is next necessary to define paint and analyse its qualities. When the chlorophyll is mixed with linseed oil and thoroughly mixed by shaking, an old piece of wood can be painted with it. But already after a week the wood losses its green colour and nothing is left of the coat of paint, only traces of the linseed oil. Conclusion: chlorophyll is not suitable as a paint. The problem is to determine why. The hypothesis indicates that chlorophyll is destroyed by heat, light, acid. The outcome of experiments to prove this hypothesis are surprising: in an intensive light the chlorophyll´s colour disappears and it is eventually destroyed. From this follows another problem: why is chlorophyll not destroyed by light in nature ? A new hypothesis concerning this problem claims that light when it enters the cell must be resorbed by the chlorophyll.

instruction + biology, botany, physiology + plant, organisational form, biological practical excercise, chlorophyll, experiment - 147313.

426. WELLS, P.:
An Ecological Energetics Field Course for Sixth Forms
Journal of Biological Education, 16, 1982, No. 4, pp. 265-274. 10 figs.
Very often ecological field work does not have a thorough theoretical framework. For this reason it tends to be a source of confusion and creates a difficult situation for the teacher. In this article the author concentrates on the problem of a food chain, which can be studied in the field. Students were given 10 different assignments based on a traditional version of a food chain; these are described in detail. Field work was supplemented with work in the laboratory. The findings were then summed up in tables which provide a comprehensive survey of the work of several groups of students. The article demontrates very well the preparation of a teacher for outdoor and class work and also provides detailed instructions for carrying out the project.

instruction + biology, ecology, field work, practical biology excercises - 147313.

11.23 Hobby clubs

427- BEZIMYANNOVA, L.A.:
V pomoshch krushku yunikh kaktusistov (Aid to young cactus cultivators)
Biologiya v shkole, 56, 1982, No. 3, pp. 68-72.

The article provides basic information on the cultivation of cacti. First the plant is briefly described and then the author deals in detail with how to treat the soil before planting cacti and the conditions they need for their successful growth. In conclusion there is a survey of cacti which are most frequently cultivated, with brief notes and comments on each specie and variety.

instruction + biology, botany, organisational form, hobby club, cultivation + indoor plants - 147317.

428. EISENHABER, F.:
Gedanken zur Entwicklung der AG/R "Microbiologie" (Ideas for developing the activities of a microbiology hobby club)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 310-313.

Microbiology hobby clubs whose activities the auther describes are among the most popular in school. They began their activities in 1970 but by now their approach and subject-matter are no longer on par with existing demands. For this reason the author suggests a new syllabus for this hobby club.

instruction + biology, microbiology, organisational form, hobby club - 147317.

429. GIERSBERG, M.:
Zur Arbeit in der AG/R "Socialistische Landeskultur" an der Botanikschule Rostock (On the activities of a hobby club devoted to the socialist landscape at the Botany School at Rostock)
Biologie in der Schule, 31, 1982, No. 12, pp. 518-520. 1 fig., 1 tab.

The purpose of this hobby club is to study the relation between society and its environment. The first step in attempts to do away with factors damaging to the natural environment is to understand their cause and effect. One such topic are bioindicators. The hobby club in question chose lichens as bioindicators. The methods of work used by the hobby club and its findings are described in detail.

instruction + biology, organizational form, hobby club, ecology - 147317.

430. HAASNER, W. - RAHMSDORF, A.:
Aus der Tätigkeit der Arbeitsgemeinschaft "Obstproduktion" an der POS Gross Kreutz (Concerning the activities of the "fruit crops" hobby club at the basic school in Gross Kreutz)
Biologie in der Schule, 31, 1982, No. 12, pp. 530-533.

The purpose and objective of this hobby club is to contribute to the structural changes taking place in agriculture. Its members are pupils from 9th and 10th classes. The authors analyse in detail the concept of the hobby club and the activities which it untertakes (phenological observations, a project to study the usefullness of honey bees, etc.) and assess the outcome of the work done.

instruction + biology, organizational form, hobby club, fruit crop cultivation - 147317.

431. HABERER, G.:
Mineralische Düngung - Grosspilzflora - Baumwachstum - Untersuchungen einer AG/R "Microbiologie" (Mineral fertilizers - large fungi - the growth of trees - projects studied by a microbiology hobby club)
Biologie in der Schule, 31, 1982, No. 12, pp. 520-522.

Hobby club activities should ideally combine theory and its practical applications. Thus pupils should be able to contribute to solving socially important tasks on the basis of using the appropriate literature and methods. The author describes her own experiences in supervising a microbiology hobby club which cooperates with the KALI enterprise in its research and development work on the subject "The Ecological Context of the Influence of Mineral Fertilizers on Large Fungi and the Growth of Trees". The author describes in detail the outcome of this cooperation.

instruction +biology, organizational form, hobby club, ecology, fertilization, funci - 147317.

432. ILIEVA, C.:
Klub na nastavnike po biologiya (A biology club for further education)
Biologiya i khimiya, 25, 1982, No. 5, pp. 50-51.

Usually outstanding and experienced biologists who are also knowledgable in nature concervation are supervisors of these clubs for further education. Under their influence pupils gain a more intensive interest in problems connected with these problems. For this reason this form of activity seems to be very effective and also has an important role to play in vocational guidance.

instruction + biology, organizational form, hobby club, vocation + guidance - 147317.

433. KOZLOVSKAYA, A.V.:
O rabote krushka "Yuniy agrokhimik" Severo-Osetinskoy stantsii yunikh naturalistov (On the activities of the Young Agricultural Chemist hobby club at the North Ossetian centre for young natural scientists)
Biologiya v shkole, 56, 1982, No. 5, pp. 67-68.

The author describes the activities of this hobby club which works in the difficult climate of the Caucasian mountains. Among the activities in which the hobby club members participate are soil analysis and experiments on the influence of various soil conditions on the growth of plants. Pupils also become acquainted with the cultivation of plants, the role of chemicals in agriculture, land reclamation, selection, improving the fertility of the soil, etc. Pupils in the school use mineral fertilisers, and experiments with growth stimulants to observe the growth of various strains and assess hybrid plants and new strains.

instruction + biology, organizational form, hobby club, - 147317.

434. SCHWIER, H.J.:
Fachgruppenarbeit im Kulturbund gibt Impulse für AG/R "Sozialistische Landeskultur" (Work in the Culture Union provides impulses for the activities of a Socialist Landscape hobby club)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 313-315.

The Cultural Union provides teachers and pupils with a number of opportunities for developing extra-curricula hobby club activities, for instance within the framework of Socialist Landscape hobby clubs. The author describes experiences from the Köthen district; he describes the work done by an entomology and an ornithology group.

instruction + biology, organizational form, hobby club, environmental conservation - 147317.

435. TITOV, A.V. - TITOVA, V.V.:
Kak u nas vedetsa vneklassnaya rabota po zoologii
(How we do extracurricula work in zoology)
Biologiya v shkole, 56, 1982, No. 1, pp. 57-68.

The authors describe the work of a zoology hobby club at a secondary school in the town of Kaluga. The club has 25 members from among pupils from the 6th to 10th classes. They describe both the theoretical studies and practical experiments and observations undertaken by the members of the club which are all done in the Kaluga region. They also mention an expedition they organized with their pupils and its outcome.

instruction + zoology, organizational forms, hobby club, secondary school - 147317.

436. ZARKOVA, L.:
Razvitie na tvorcheskite spocobnosti u uchenitsite chrez izvnklasnata rabota po biologyi (Developing the creative abilities of pupils in extra-curricula work in biology)
Biologiya i khimiya, 25, 1982, No. 5, pp. 48-49.

For developing the cognitive abilities of pupils extra-curricula ectivities should be done in such a way that they supplement, extend and make deeper the biological knowledge gained in class work. Experiments and observations are very important in this context. The mathematics general education secondary school in Plovdiv has since 1974 had two biology hobby clubs: Young Nature Lovers from the 9th class and General Biology and Genetics for pupils in the 10th and 11th classes. Various forms of activities are undertaken, for instance an expedition was organized to the rivers Maritsa and Arda to study water pollution; later a conference and an exhibition were organized on this topic. The author also describes some of the practical activities done by hobby club.

instruction + biology, organizational form, hobby club, biology conference - 147317.

11.24 Biology discussions

437. BAEV, S.Y.:
Shkolniy vecher "Leninskiye zavety ob okhrane prirodi i prirodopolzovanii" (School discussions on "The Leninst Heritage of Nature Conservation and the Utilization of Natural Wealth"
Biologiya v shkole, 56, 1982, No. 2, pp. 61-65.

An important factor in ecological education is the attainment of a Leninist approach towards nature in the young generation. Pupils should be educated towards nature conservation and the correct utilization of all natural resources. The author describes various discussions on this subject, which are especially suitable for biology hobby clubs. An interdisciplinary approach to the subject, which includes biology, history, geography, physics and chemistry aspects, is called for. The discussion described by the author concerned problems of the natural environment, water, air and the soil. A detailed outline of all problems mentioned is provided.

instruction + biology, ecology, organizational form, biological discussion, nature conservation, interdisciplinary relations - 147317.

438. KOLPAKOV, A.A.:
O vneklassnom chtenii uchashchikhsya (On the extra-curricula reading of pupils)
Biologiya v shkole, 56, 1982, No. 4, pp. 71-74.

The author is a member of the Department of Pedagogics and Psychology at the Borisoglevski Pedagogical Institute. Here he reports on a study project concerning the extra-curricula reading done by pupils which concerned various subjects; he concentrates specifically on biology. At present there is a sufficient amount of scientific or popular scientific literature on biology available, but the study indicated that of a total of 4250 pupils from the 5th to 10th classes in the Voronezh, Saratovsk and Tambovsk regions which were studied, only 6.4 % read biology books and journals. The author analyses the causes of this fact and recommends that teachers use literature to a greater extent, speak about it to pupils and arouse an interest in it. Also in classwork this type of literature can be made use of as a source of further information, as the topic of assignments, etc. Cooperation between the teacher and school librarian should also be improved.

instruction + biology, organizational form, biological discussion, literature + biology, work with literature - 147317.

10.28 Work on experimental school plots of land

439. ONOPRIENKO, E.N.:
Zelenoe okno v mir (A green window to the world)
Biologiya v shkole, 56, 1982, No. 6, pp. 69-70.

The author provides information on the work done by pupils in the 4th secondary school in Pavlodar, in the Kazakh SSR on their experimental plot of land, which has 3 hectars and has planted on it a total of 1400 shrubs and 900 fruit trees and other plants. The pupils planted rows of Black and Lombardian poplar trees and called them the Friendship Alley, Krupska Alley and Victory Alley. The hothouses and garden beds serve for experiments. Also material for biology practical excercises is cultivated. The hothouse has over 80 species of plants. The school has won a number of competitions. During vacation time the Young Pioneer Organization takes care of the garden, orchards and hothouses. The biology hobby club of the school has over 100 members and they also work extensively on the plot of land, which also makes an important contribution to vocational guidance.

instruction + biology, organizational form, hobby club, work on school plut of land - 147317.

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11.31 Excursions, hiking camps, field work

440. ALTMANN, A.:
Zimní houby (Winter Mushrooms)
Přírodní vědy ve škole, 33, 1981-1982, No. 6, pp. 218-220. 4 photos.

Even during a winter excursion to the forest mushrooms can be collected and some of them are excellent edible species. Others can be made use of in botany teaching since fungi are in the teaching syllabus for the 5th class during the winter months. The author provides a list of winter mushrooms with their Czech and Latin names.

instruction + biology, organizational form, excursion, mushrooms -147313.

441. BACA, J.B.:
Teaching Biology Field Courses in the Wake of Environmental Disasters
The American Biology Teacher, 44, 1982, No. 1, pp. 22-24 and 32. 2 figs.

A field excursion immediately after an environmental disaster has occured can be very instructive and educational. The author has in mind especially floods, windbreaks, land slides, pollution by chemicals or waste, the large-scale incidence of insect pests, etc. In the damaged area the observer can study the effects of the catastrophe and its consequences for the landscape. The author provides recommendations of problems on which to concentrate, how to take measurements and samples of flora and fauna.

instruction + biology, organizational form, excursion, observation, flora, fauna -147313.

442. BICAK, L.J.:

Schoolyard Science

The American Biology Teacher, 44, 1982, No. 3, pp. 153-156.

Outdoor excursions are considered to be an excellent organisational form in which immediate contact with original natural objects can be made. But in cities this is often connected with the need to travel large distances and thus use up a great deal of time. The author therefore suggests using a schoolyeard, where insects, birds, trees and flowers can be studied in their own environment, in their development and death. He stresses that in such a relatively simple environment a large number of study objects can be found for various areas of biology, which can be dealt with in the same way as when a costly excursion to a distant wild area is organized.

instruction + biology, organizational form, excursion - 147313.

443. BIGGS, A.L.:

An Interdisciplinary Course in Big Bend National Park, Texas

The American Biology Teacher, 44, 1982, No. 4, pp. 219--223. 8 figs.

The author describes the preparations of a complex week-long ecological and geological excursion to the Big Bend National Park in Texas and the course of the excursion itself. The careful preparations proved to be worth while; students had the opportunity to study desert ecology, the geological structure of cliff structures and the history of the American Southwest. On the basis of specific examples the author stresses the team work done by the students. After returning, each student wrote a report. The excursion took 2 weeks.

instruction + biology, organizational form, excursion - 147313.

444. BONATZ, H.H.:
Fortbildung unterwegs. Ein Kapitel Evolution von Ort studiert. Hans Gruppe gewidmet zum 75. Geburtstag
(Further education combined with travelling. A chapter on evolution studied on the spot. In honour of Hans Gruppe´s 75th birthday)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 4, pp. 113-116. Lit. 12 4 figs.

Evolutionary biology is an important component of the biology course both from a teaching and educational point of view. Teachers undergoing inservice training should therefore make visits to natural history museums and to fossile sites outdoors. The author describes some of the trips he made with his students from the faculty at Lüneburg, during the 1981 vacation, to the natural history museum in Senckenberg, the Museum of Primitive Man in Steinheim, the Hauff Museum in Holzmaden/Teck in Würtenberg, the Jurassic Museum in Willibaldsburg and a number of other museums. The purpose of these excursions was to learn more about the Mesozoic era and especially about Mesozoic reptiles from the Jurassic and Cretaceous eras, praehistoric birds from the Jurassic era, mammoths and other Proboscidea from the Quartenary era and some sections of the history of the development of man. Participants in the excursion also had the opportunity to collect fossils at some sites. In the natural history museum in Frankfurt they were able to observe the bones of various praehistoric animals. At the zoo in Frankfurt they saw living primates. The article shows very well how summer recreation can be combined with further education.

instruction + biology, organizational form, excursion - 147313.

445. COLMAN, M.:
Woodland Biology for a Hundred Boys
The School Science Review, 64, 1982, No. 227, pp. 249-258. 10 figs., 4 tabs.

A mixed forest measuring 1.8 hectars is part of the school plot of land at a boys school in Sevenoaks in Britain. The author describes teaching there and methods by which the forest was used for teaching purposes, from spring until autumn. She has a whole series of topics and questions, which the pupils are given in the form of assignments. They collect leaves and berries and draw them; they study the small fish pond found in the forest and observe the animals found there, beginning with insects, to a badger. The author has made the area into a living biology laboratory.

instruction + biology, organizational form, excursion, forest - 147313.

446. CROFT, P.:
Education in the Field - The Work of the Field Studies Council
Journal of Biological Education, 16, 1982, No. 2, pp. 105-107. 2 figs., 2 tabs.

The Field Studies Council, founded by the London science supervisor Mr. Butler, has been active for 35 years. It has 10 centres in England and Wales, and a similar exists in Scotland. In the centres teachers and others hold courses on problems concerning the environment. The centres are visited by basic and secondary school pupils, as well as students from colleges and universities, biology and geography teachers and amateur nature conservationists and natural scientists. The lectures concern the history of the local natural environment, its geology, geography, archeology and also local crafts, architecture and folk art. The author, who also worked in these centres, describes their activities in detail.

field work - organizational form, educational activities - 147313.

447. CROTHERS, J.H. - LUCAS, A.M.:
Putting Biology Students Out to Grass: The Nettlecombe Experiment after Thirteen Years
Journal of Biological Education, 16, 1982, No. 2, pp. 109-114. 5 figs.

Nettlecombe is one of the Field Studies Council centres which specializes in the long-term study of meadows and grazingland on which teams of students work under various conditions and during various seasons. The author provides information on the course and outcome of the long-term studies carried out there and comments the various changes which have occured in the flora and fauna of this type of biota.

instruction + biology, organizational form, field work, living communities, meadows - 147313.

448. DIRCKSEN, R. - GERHARDT, A.:
Biologieunterricht im Labensraum Wattenmeer mit Schülern
(Teaching biology to pupils in the living space of the sea mud flats.
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 5, pp. 146-153. Lit. 14, 1 tab., 8 figs.

At present the only naturally intact living environments in Europe are found high in the moutains or on the sea mud flats. The latter have remained intact because so far this area of the sea coast has not become industrialized. The mud flats represent a very rich ecosystem and for this reason they are a place to which numerous excursions are organized. They contain a number of sub-systems, so that some botany or zoology objects can be found at all times for study and observation and a number of ecological aspects can be studied and analysed. The authors define the sea mud flats (Watten), their size and main characteristics. They cover about 450 kilometers of coastline in the FRG, Denmark and the Netherlands; they reach to a width of from 5 to 15 or 20 kilometers inland. They take up a total of 730 000 hectars. The authors explain how they develop (they contain both sandy and muddy areas), the effects of the tide on them, the deposits of sediments, the development of so-called ripplemarks and sand dunes and the adaptation of organisms to this environment. In conclusion the authors describe preparations for an excursion to the mud flats, what should be taken along and also provide a bibliography on the subject.

instruction + biology, organizational form, excursion, seacoast - 147313.

449. DIRCKSEN, R. - HÜNER, P.:
Den Flutsum entland (At high tide)
Naturwissenschaften im Unterricht - Biology, 30, 1982, No. 5, pp. 154-160. Lit. 5. 3 workscheets, 2 figs.

The author describes a school excursion to the seacoast which was combined with the collection of plants and animals found on the beach after the high tide has receded. 3 worksheets are attached to the article which make it easier for the pupils to identify what they find: they contain description and pictures of the most frequently found flora and fauna. For less common finds, the author provides a bibliography which will help teachers and pupils.

instruction + biologie, organizational form, excursion, seacoast - 147313.

450. EICKSTEIN, J.:
Jugendwaldspiele (Forest games for young people)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 12, pp. 445-447. 1 fig.

In the town of Reusenstamm the local Association for the Conservation of the German Forest offered the local school mutual cooperation. Due to the efforts of the school's biology teachers and its principal, this cooperation has developed extensively. In 1973 the first Youth Games were held for groups of pupils who were interested in nature conservation. Such annual games are now organized frequently, not only in the FRG, but also in Austria, where they are also held for physically and mentally handicapped children. At a typical Forest Games, approximately 300 pupils, divided into groups of 10, compete with each other in solving various assignments which concern the function of the forest in the environment, forest fruits, biologically combating pests, forest birds, food chains in the forest, practical knowledge of various species of trees, etc. Included among the assignments are also physical education tasks. The competition was for pupils from the 6th classes and participants recieved diplomas.

instruction + biology, nature conservation, nature conservation + associations, living communities, forest - 147313.

451. FIDO, H.S.A. : GAYFORD, C.G.:
Field Work and the Biology Teacher in Secondary Schools in England and Wales
Journal of Biological Education, 16, 1982, No. 1, pp. 27-34. 9 rabs.

Field work in biology is becoming an important component of biology instruction. The authors have been studying this aspect of teaching 11 to 16 year-olds for twenty years and they here attempt to carry out an assessment which is sumed up in tables and concerns various aspects of field work from the point of view of both the pupil and the teacher. The article provides a survey of practical teaching procedures used in public and private schools and makes comparisons between both.

instruction + biology, organizational form, field work, state schools, private schools, England, Wales - 147313.

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452. GÄRTNER, M.:
Zum Erkennen der Anzahl und Lage der Spaltöffnungen an Blättern während der ökologischen Exkursion
(On determining the number and position of stomata on leaves during an ecological excursion)
Biologie in der Schule, 31, 1982, No. 2-3, pp. 85-89.
5 figs., 2 tabs.

The teaching syllabus for biology instruction in the 12th class includes learning to identify the number and position of stomata in leaves, but the textbook does not contain any information on this subject. The author has studied a number of plant species from this point of view and here sums up his findings. He describes in detail the making of microscopy mounted specimens. He divides plants into hydrophytes, mesophytes, xerophytes, evergreens and succulents. His findings are summed up in tables which provide data on the number and position of stomata.

instruction + biology, ecology, organizational form, excursion, cover tissue - 147313.

453. GÄRTNER, M.:
Zum Erkennen xeromorpher und hygromorpher Blattstrukturen während der ökologischen Exkursion (On learning about hygromorphous and xeromorphous structures of leaves during excursions)
Biologie in der Schule, 31, 1982, No. 10, 1982, pp. 417-423. 6 figs.

The teaching syllabus for the 11th class requires that pupils learn about how organisms adapt to abiotic factors. Vegetative organs have special functions during dry periods, which they survive by closing stomata and thus reducing to a minimum their gas metabolism. Often their leaf area is reduced. The author deals in detail with the xeromorphous structure of leaves. Among the examples he uses are the oleander, the doghish, and Marram grass. The article contains an outline of a teaching lesson called "The structure and function of xerophytocus leaves". Hygrophytes are plants which are vulnerable to a lack of water and which develop hygromorphous structures (for instance plants which prosper in the shade). The author cites the example of the anemone, the ragwort, the Marsh marigold, the buttercup, the spurge and others. Their common characteristics are large leaf blades, thin epidermal structures, a thin layer of cuticle, an often absent parenchyne layer, a weakly developed root system and a small number of stomata.

instruction + biology, organisational form, excursion, ecology - 147313.

454. GERHARDT, A.:
Pflanzen der Küste (Plants on the seacoast)
Naturwissenschaften im Unterricht - Biologie, 30, No. 5, pp. 164-174. Lit. 14, 2 worksheets, 7 figs., 5 tabs.

The author provides instructions for oganizing an excursion to collect plant specimens on the seacoast, i.e. plants which grow in the marshland or in a sandy or saline water environment. Also included are plants found on the saline meadows of the coast, on sand dunes, etc. The author describes how these plants have adjusted to the extreme conditions found there, which include salinity, high winds, and often blown sand. The plants are described from a morphological, physiological and ecological point of view. Stress factors, as well as characteristics of the sea bottom are described, as well as the influence of alternating tides and the sand dunes found on the coast. The author also discusses the influence of vegetation on the forming of islands and how they retain their structure in the shallow seas of the mud flats. The need for nature conservation measures in this area are stressed and the importance of algae. Pupils study the zones formed by flora in this area and on demarcated experimental areas they record all the species of plants found there. The article describes both with words and pictures the most important plants and algae found on the coast and in the sea. Also plant communities and their specie composition are described.

instruction + biology, organizational form, excursion, seacoast, plant communities - 147313.

455. HAMBLER, D.J. - DIXON, J.M.:
Limnological Projects
Journal of Biological Education, 16, 1982, No. 2, p. 115-122. 8 figs.

The authors describe the collection of a large number of specimens of micro-organisms in a fish pond during the course of a year. On the basis of this material, students at the end of the school year carry out ecological study projects. Algae predominates among these microorganisms. The authors describe how they divided the fish pond into various sections with the aid of poles stuck into the pond bottom. Students carry out physical and chemical measurements in weekly intervals during the whole year. An appendix lists all the required instruments and equippment for the project.

instruction + biology, field work, ecology, living communities, fish pond - 147313.

456. HASS, G.:

Zielstellungen, Bedingungen und Erfahrungen bei der Durchführung der ökologischen Exkursion in Klasse 11.

(A formulation of the objectives, conditions and experiences gained in carrying out an ecological excursion in the 11th class)

Biologie in der Schule, 31, 1982, No. 2-3, pp. 78-82. 2 tabs.

The author deals first with the objectives of school excursions, their practical organization and the selection of conditions for the excursions.

The greatest amount of attention is devoted to carrying out the excursion, which in the case described concentrated on abiotic factors in the environment and the importance of relations between organisms and the environment. In conclusion the author discusses how an excursion should be assessed and its importance for further classwork.

instruction + biology, organizational form, excursion, ecology - 147313.

457. HEATON, A.:

Teaching Field Biology in Towns

Journal of Biological Education, 16, 1982, No. 3, pp. 173-176. 2 figs.

Even in large cities, such as London, field work in biology can be done with pupils. The author recommends that each large city should have an ecological park - in London one has been founded a number of years ago near the Tower Bridge on the river Thames. The author describes a number of projects and assignments which can be done in such a park, its advantages and the results achieved. In conclusion she deals with some basic ecological terms which should be explained within the framework of the described field work.

instruction + biology, organizational form, field work, large city, ecology, biology - 147313.

458. HUNNESHAGEN, H.:
Ökologische Exkursion langfristig vorbereiten und erziehungswirksam gestalten (Ecological excursions should be planned for the long-term and concieved in an educational manner)
Biologie in der Schule, 31, 1982, No. 11, pp. 461-464. 1 tab.

A number of problems are connected with the organisation of a biology excursion in the 11th class. The author therefore describes her own experiences in this area and stresses the need to be aware of the educational objectives of the excursion, such as learning precision, team work and honesty. She acquaints her pupils with the long-term plan of excursions. The organizational preparations for an excursion are described in detail, including the division of pupils into groups.

instruction + biology, organizational form, excursion - 147313.

459.
JURCZYNSKA, H.:
Najciekawasze sę wycieczki (Excursions are the most interesting of all)
Biologia w szkole, 35, 1982, No. 1, pp. 32-33. 2 tabs.

The author describes an excursion held within the framework of a school round of a competition organized by the Nature Conservation League of Poland (LOP), at Nowojowej in the Nowy Saçz region. 36 participants in the competition participated in the excursions, together with educators from the Institute for the Further Education of Teachers, specialists in the didactics of biology and other teachers. During the excursion observations concentrated on nature conservations. Pupils observed old trees, measured their circumference, height, structure of leaves, etc. and attempted to determine the age of the tree. The educational objective of the excursion was to teach pupils correct behaviour in a natural environment.

instruction + biology, organizational form, excursion, nature conservation - 147313.

460. KĘDZIERAWSKA, Z.:
Wycieczka botaniczna (A botanical excursion)
Biologia w szkole, 35, 1982, No. 4, pp. 254-255.

The most frequently use and from the point of view of didactics the most important form of biology instruction is an excursion combined with the study of an original object. The author cites the educational and teaching objectives of excursions. She then describes a specific botanical excursion to Chełmie and its vicinity. She describes the reserve,some of the plants which grow there and in its vicinity, for instance in Stawska Gora, Górza Chełmska, Wolwinow and Brzeźno. The Chełmsk region contains a total of 16 nature reserves and 20 protected objects, as well as a number of botanically very interesting sites.

instruction + biology, organizational form, excursion, botany - 147313.

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461. MANNESMANN, R.:
Muschel- und Schneckenschalen des Flutsaumes
(Bivalve conches and mollusc shells after a high tide)
Naturwissenschaften im Unterricht - Biologie, 30, 1982,
No. 5, pp. 161-163. Lit. 6, 2 worksheets.

The author describes bivalve conches and mollusc shells which are most frequently found on the beach after the high tide has receded. He describes the size, colour, shape and other diacritical characteristics of these shells and a bibliography of the most important descriptive literature on them. The author also describes the structures of shells and conches, the material they are made of, how they are built and also the life of their carriers. Specific instructions for the collection of specimens are provided.

instruction ◆ biology, organizational forms, excursion, seacoast, bivalves, molluscs - 147313.

462. MANNESMANN, R.:
Untersuchung des Ökosystems "Watt". Ein Exkursionsmodell
(A study of the ecosystem of the mud flats. A model excursion)
Naturwissenschaften im Unterricht - Biologie, 30, 1982,
No. 5, pp. 170-180. Lit. 5, 3 worksheets, 1 fig.

This model excursion is planned for several days spent at the seashore in the region of the mud flats. The excursion is conceived for pupils in the 9th and 10th classes. Its purpose is to carry out vertical and horizontal descriptions of a chosen section of the mud flats. First the surface structures of mud and sand are studied, then the fauna of the area, its food, prints, etc. Finally a vertical study of the mud and sands of the area are undertaken and the numbers of various species of flora and fauna found there.

instruction + biology, organizational form, excursion, seacoast, ecology - 147313.

463. MORTIMER, M.E.A.:
The Brathay Centre for Exploration and Field Studies
Journal of Biological Education, 15, 1981, No. 4, pp. 279-284. 5 figs.

Brathay Centre is a nature study facility for young people which was founded in 1946 on the shore of Lake Windermere in northern England. It provides many opportunities for carrying out observations and experiments in the wilderness and for studies concerning the local flora and fauna, geology, hydrobiology, geography and ecology. The lodging section, laboratory and lecture hall, as well as cinema facilities are all run by educators in various natural sciences who organize either short-term or longer-term courses, especially during school holidays. The Centre publishes its own Bulletin which prints the findings of the research carried out by young people at the Centre.

instruction + biology, organizational form, field work - 147313.

464. PASKALEV, G.:
Preuchvatelna deynost na uchenitse v prirodata i neynata okhrana (Studies carried out by pupils in the course of their nature conservation activities)
Biologiya i khimiya, 24, 1982, No. 4, pp. 49-52.

Among the main tasks of school is not only the provision of various information, but also the forming of a scientific conservationist worldview on the part of pupils. An interest in nature and its conservation leads pupils to observe and draw conclusions from what they see. To assure that their analysis is correct, observations should follow specific rules: an object should be observed continuously and it should not be collected. It should be an object important from the point of view of nature conservation and ecology, and it should be within the mental grasp of the pupils. Pupils should be entrusted with adequate conservation activities. Such activities are often undertaken by Young Pioneer Groups in "Young Agrobiologist" hobby clubs. The author describes the activities of such a hobby club which made a significant contribution to ecological studies concerning the Red forest ant.

instruction + biology, organizational form, field work, ecology, insect - 147313.

465. SHOWEKK, J.P.M.:
Organizing Fieldwork Expeditions: Some Common Problems
Natural Science in Schools, 20, 1982, No. 2, pp. 45-48.

When an expedition is being organized all potential dangers, possibilities of accidents and other difficulties which the teacher and pupils might encounter along the way should be taken into account. The author describes the preparations for an expedition, what should be organised in advance, what to do along the way when difficulties arise, including medical problems, which are dealt with in detail. The article is highly instructive for anyone organising a larger (or longer lasting) excursion.

instruction + biology, organizational form, excursion, work safety - 147313.

466. SCHIEFER, H.:
Erste Erfahrungen zur Gestaltung der ökologischen Exkursion in Klasse 11 (First experiences with organizing an ecological excursion in the 11th class)
Biologie in der Schule, 31, 1982, No. 2-3, pp. 83-84.

The first ecological excursions have been organized in the 11th class according to the new teaching syllabus for general education secondary schools introduced in the school year 1980-1981. Five articles have been published in the journal Biologie in der Schule on this topic, which together provide a basis for planning this excursion. The aim of the present article is to sum up existing experiences on this subject.

instruction + biology, organizational form, excursion, ecology - 147313.

467. WALICKA, T.:
Wycieczki dla klasy IV. Instrukcje ćwiczeniowe
(Excursions in the 4th class. Instructions for carrying out excercises)
Biologia w szkole, 35, 1982, No. 1, pp. 34-37.
2 didactical tests.

The author deals with the didactical opportunities provided by excursions to a potato field and to an orchard. She discusses the didactical preparations she made to study factors which influence the growth of both types of plants in artificial plant communities. She discusses factors of living and non-living nature, the soil, the weather, the temperature of the air and on the field surface. The structure of the potato plant is described, as well as the fauna found on a potato field and food relations among organisms. The same procedure is used for preparing an excursion to an orchard. Here various species of fruit trees are studied, the fauna found in an orchard, especially the insect pests of fruit trees and food chains which develop in this environment. In conclusion seven multiple-choice questions are given.

instruction + biology, organizational form, excursion, potatoes, orchard - 147313.

468. WERNER, E.:
Schädlinge an Obstbäumen und ihren Früchten am Beispiel des Apfelbaumes (Fruit tree pests on the basis of the example of apple trees)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 7, pp. 239-241. Lit. 4, 1 worksheet.

On the basis of the example of the apple tree pupils can become acquainted with a number of insect pests -including the plant louse, the Apple blossom weevil, the chigger and the Ephestia insect. These insects have been chosen in such a way that they correlate with various stages of the development of the buds, blooms and fruit which are attacked by different pests. In 2 teaching lessons various methods of preventing or combating pests are explained, as well as the use of natural enemies of these pests. Especially older and tested methods of combating pests are described. The author also recommends school films on these subjects which can be shown in the course of lessons. Practical recommendations for combating pests are given, such as the burning of infected leaves and bark to destroy insect eggs, larvae and pupae, as well as mold and rust, and painting tree trunks with special chemicals, giving insectivorous birds opportunities for building nests, conserving hedgehogs, bats, strengthening the resistence of trees against pests by fertilizing and cutting them and correctly chosing their site and strain. Some plants, for instance the Crown imperial plant, act as a resistant to the meadow mouse which tends to damage root systems and thus weakens trees.

instruction + biology, organizational form, excursion, plant community, orchard, ecology + fauna, biological combat - 147313.

469. WŁOSIK-BIEŃCZAK, E.:
Wycieczka do zoo. Kospekt lekcji dla klasy IV.
(An excursion to the Zoo. The outline of a lesson for the 4th class)
Biologia w szkole, 35, 1982, No. 2, pp. 110-112, Lit. 2.
1 cross word puzzle.

The author describes an excursion to the Zoo for teaching the topic "How are animals adapted to living in a terrestrial environment." The relevant item in the teaching syllabus is called "A terrestrial environment". The educational objective of the excursion is to acquaint pupils with new species of animals and the relation between their structure and way of life. Among the wider objectives of the excursion are increasing pupils´ interests in biology and zoology, making use of available biological literature, strengthening humanitarian principles in pupils´ worldviews, learning to narrate what they have seen at the Zoo, etc. Before going to the Zoo, pupils (or their groups) receive assignments to describe the following: squirrels, the manner in which the wildcat and the lynx are adapted to life in trees, the woodpecker, the stork, important flying animals (bats), the Mountain goat, elk, bear, hybernation, arboreal, ground and flying animals.

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instruction + biology, organizational form, excursion, zoological garden - 147313.

11.32 Socially beneficial work, voluntary work done by pupils

470. AGAYEVA, V.A. - ROZHKOVA, T.A.:
Dobraya traditsiya (A good tradition)
Biologiya v shkole, 56, 1982, No. 5, pp. 62-63.

In this article the author describes activities by pupils at the Ragozin secondary school. The educational objective of the school's staff is to arouse in pupils an interest in working in agriculture, since this is a rural area and the majority of pupils should stay in the village and work in agriculture. The main method of achieving this objective is to organize work teams of pupils to work in agriculture. The authors also discuss the work of their pupils in the local kolchoz and the jobs which pupils take after graduation.

instruction + biology, organizational form, excursion, work teams, vocational education - 147313.

471. YAKOVLEV, V.A.:
"Malaya Timiryazovka" nashey shkoli (A "little Timiryazev Academy" hobby club in our school)
Biologiya v shkole, 56, 1982, No. 2, pp. 66-69.

Since the school year 1961-1962 the pupils in the hobby club named in the title have been working on the school's experimental plot of land. Under the supervision of the biology teacher they learn to organize all sorts of experiments. Among those who cooperate with the hobby club are the principal of the school, other teachers, the agricultural engineer of the local collective farm, pupils from the local apprentice training centre, etc. The school plot of land has an area of 1.5 hectars and a 2 hectar park. The pupils also take care of greenery in the village and in the vicinity of the river Veksa. The author describes the history of the hobby club and the problems which the pupils have coped with in helping the agriculture of the region. The pupils have also contributed to solving tasks provided by the Ukranian Genetic Institute concerning hybrid rye and wheat (Triticale) and the testing of new strains. The school has an orchard, cultivates 400 species of decorative plants, 130 plants in hothouses and various varieties of potatoes. Phenological observations have been carried out for 20 years.

instruction + biology, organizational form, socially beneficial work, work team - 141313.

472. KOPANEVA, E.M.:
Vsesozyuzniy slet trudovikh obedinenii shkolnikov posvyashchenniy 60-letiyu obrazovaniye SSSR
(All-Union Meeting of Work Associations of pupils devoted to the 60th anniversary of Soviet education)
Biologiya v shkole, 65, 1982, No. 6, pp. 57-61.

In the capital of the Kazakh Soviet Socialist Republic the All-Union Meeting of Pupil Work Associations took place. 600 boys and girls participated and discussed their work team activities in agriculture and forestry operations; also educators and teachers active in this area were present at the meering. New competitions for pupil work teams were announced, which will have 5 rounds and will include practical assignments, as well as answering theoretical questions.

instruction + biology, organizational form, socially beneficial work - 147313.

473. KOSTENKO, P.I. - CHERNISHEV, N.A.:
Kuznice kadrov (The making of workers)
Biologiya v shkole, 56, 1982, No. 5, pp. 60-62.

The authors describe the activities of pupil work teams in a school in the Krutinsk region. For 25 years the pupils of this school have been working in agricultural production. The organization of their work and how it is combined with class work in various school subjects is described. Special attention is devoted to an assessment of pupils´ work. The important influence of this work on the vocational guidance of pupils is stressed. For proof of the effectivness of this guidance, statistics concerning the occupational choices made by pupils in the school are cited.

instruction + biology, organizational form, socially beneficial work, vocational education - 147313.

474. MALTSEVA, L.N.:
Nasha brigada (Our work team)
Biologiya v shkole, 56, 1982, No. 5, pp. 59-60.

The author describes the work of pupil work teams at a secondary school in Pavlodarsk. Since 1975 the school´s work teams have been cooperating with the Stanicheskiy Sovkhoz which has set aside machines, fields and animals for the pupils to work with. The work teams work in the sovkhoz all year and have achieved very good results. The author deals in greater detail with the positive results this work has attained.

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instruction + biology, organizational form, socially beneficial work, work team, agriculture - 147313.

475. MIRZOYEV, I. - KARIMOV, B.:
Yuniy naturalisti Tadzhikistanu (Young natural scientists for the benefit of Tadzhikistan)
Biologiya v shkole, 56, 1982, No. 5, pp. 65-67.

The authors acquiant the reader with the history of biology teaching in Tadzhikistan and the history of extra-curricula educational facilities which specialize in the natural sciences in the Tadzhik Soviet Socialist Republic. They describe the work done by these facilities before and during World War II and their activities at present. In conclusion they describe the results achieved by young natural scientists.

instruction + biology, organizational form, socially beneficial work, history, present situation -147313.

476. VOYNOVA, G.Y.:
Gotovim truzhenikov sela (How we train the labour force for villages)
Biologiya v shkole, 56, 1982, No. 5, pp. 63-65.

The author describes how in the Omsk region the interests of pupils in working in agriculture, especially in animal husbandry are developed. The first example cited is that of the secondary school and sovkhoz in Kurumbelsk. The state farm (sovkhoz) specializes in sheep breeding and the school formed a pupil work team for sheep breeding which cooperates with the sovkhoz. The work team has achieved very good results, but what is most important is that after graduation the majority of the work team members decide to work in agriculture. In the second part of the article the author discusses the breeding of rabbits by pupils. These hobby clubs exist in various secondary schools; they cooperate with collective farms and develop the interest of pupils in animal husbandry.

instruction + biology, organizational form, socially beneficial work,hobby club, animal husbandry - 147317.

11.4 Biology Olympiads, biology competitions

477. FRONĚK, J.:
Malé i velké problémy biologické olympiády
(Big and small problems connected with the Biology Olympiad)
Přírodní vědy ve škole, 33, 1981-1982, No. 9, pp. 328-329.

Together with the restructuralization of teaching the natural sciences in the upper classes of basic school, also a new organizational statute of the Biology Olympiad has been drawn up: it introduces changes which have occured in teaching within the framework of the new teaching and educational system. In the 1981-1982 Olympiad, problems connected with nature conservation and the environment predominate. The Council for the Environment of the Czech Government has become the sponsor of the Olympiad. For entering the competition each pupil must first help out in practical forestry work or in the planting of trees in parks and urban greenery areas, in the collection of medicinal herbs, participation in the Brontosaurus movement and other activities. During the school rounds of the Olympiads, usually approximately 13 000 pupils participate, in the district rounds 3000 pupils and in the regional round about 500 pupils. Every year the Julius Fučík Central Young Pioneer and Youth House (its natural science department) publishes instructions and topics for the independent assignments which make up the school rounds of the Olympiad. In some cases in the past, however, teachers did not inform their pupils on the possibility of participating in the competition. 23.9 % of all pupils obtained the questions and assignments at the beginning of the school year and 21 % only 2 months or less before the deadline for sending in answers. In two thirds of the schools studied, the pupils did not know anothing about the Biology Olympiad. In the group of pupils studied 6.5 % were from the 5th class, 6.5 % from the 6th class, 40.8 % from the 7th class, 43 % from the 8th class and 3.2 % from the ninth class. The study included 1620 pupils. 81.7 % learnt about the competition from their teachers, 12.9 % from the supervisor of their hobby club, 5.4 % from elsewhere. 25.8 % of the pupils said that their school helped them a lot, 53.7 % that the school had helped them at least in partial problems, 20.4 % said they worked entirely independently. In 10 schools the school round of the competition was not held at all. The district rounds were of very good quality, while the regional rounds were subject to some criticism.

instruction + biology, organizational form, Biology Olympiad - 147317.

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478. MICHSJLOW, W.:
XIII Olimpiada Biologiczna dla uczniów szol srednich w roku szkolnym 1983/1984 pod heslom Zycie a chemizacja środowiska (The 13th Biology Olympiad for pupils of secondary schools in the school year 1983-1984 with the motto Life and the Use of Chemicals in the Environment)
Biologia w szkole, 35, 1982, No. 4, p. 251.

The organizers of Biology Olympiads this time are the Polish Ministry of Education, The Committee for Biology Olympiads, The Institute of the M. Copernicus Polish Natural Science Society and the Nature Conservation League. The Olympiad will have three rounds, the finals will take place on May 7th and 8th, 1984.

instruction + biology, organizational form, Biology Olympiad - 147313.

479. NIKISHOV, A.I. - SHOTT, N.L.:
Pervaya Vserosiyskaya Olympiada shkolnikov (The first All-Russian Olympiad of school pupils)
Biologiya v shkole, 56, 1982, No. 3, pp. 42-45.

The authors acquaint readers with the organization, course and outcome of the 1st All-Russian Biology Olympiad and the assignments which were given to pupils in the national round of the Biology Olympiad of the Russian Federation. The outcomes achieved by various winners are compared.

instruction + biology, organizational form, Biology Olympiad - 147317.

480. ZDEBSKA, J. - SIEROSLAWSKA:
Final XI olimpiady biologicznej pod haslem Woda i zycie
(The finals of the 11th Biologiy Olympiad with the motto Water and Life)
Biologia w szkole, 35, 1982, No. 4, pp. 249-250. 1 tab.

On May 3rd to 5th 1982 the finals of the 11th Biology Olympiad were held in Warsaw, at the Warsaw University. 125 finalists from all of Poland participated. A written test on the subject-matter of school biology made it possible to eliminate a large number of contestants. The finals were supervised by W. Michajlow who assessed in a positive manner the work of both pupils and teachers. General Huszcza spoke for the Ministry of Education. 25 written essays received awards. After the winners were awarded, the topic of the next Olympiad was announced. In 1982-1983 this topic will be Soil and Life.

instruction + biology, organizational form, Biology Olympiad - 147317.

481. ZDEBSKA-SIEROSLAWSKA, J.:
Uwagi o realizacji XIII olimpiady biologicznej
(Notes on the realization of the 13th Biology Olympiad)
Biologia w szkole, 35, 1982, No. 4, pp. 251-254.

The 13th Biology Olympiad will take place with the motto: The Use of Chemicals in the Living Environment. Essentially it will concentrate on the use of chemicals in crop and farm animal production and their damaging effects on the environment, the influence of industrial exhalations on the life of plankton and crustaceans in an aquatic biocoenosis, and on bio-tests to help determine the toxic effect of selected chemicals. Also the influence of the rational use of chemicals will be studied from the point of view of flora and fauna, the inproper use of chemicals, the influence of detergents and other chemicals on plankton, algae, protozoa and crustaceans.

instruction + biology, organizational form, Biology Olympiad - 147317.

11.94 Group instruction

482. DUDEL, H. - JAHN, T.:
Ein Beitrag zum "Programmierten Gruppenunterricht" in Biologie: Mensch und Schimpanse - ein Vergleich
(A contribution to programming group instruction in biology: Man and the Chimpanzee - a comparison)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 7, pp. 248-257. Lit. 6, 1 test, 1 teaching program.

This programmed group instruction is planned to assure the active participation of pupils working in groups on a project to compare chimpanzees and man. The basic text provides an outline of the subject-matter to be dealt with. Related signs and characteristics in man and primates are compared, as well as their behaviour. The fact that both species are related is stressed. Man differs from the chimpanzee by his ability to think and speak.

instruction + biology, human biology, group instruction, teaching program, comparisons - 147313.

12.2 Training teachers for instruction, for teaching lessons and for other organizational forms of biology instruction

483. EKERN, P.P. et al.:
Bias in the Science Classroom
The American Biology Teacher, 44, 1982, No. 5, pp. 295-297

The average citizen tends to consider the natural sciences as being without bias and that bias is something reserved for such subjects as history, economics or other social sciences. A group of authors here subjects the question of bias in the natural sciences to scrutiny. They come to the conclusion that just as in other academic fields and in society in general, bias is an integral component of the study of the natural sciences and this has been the case throughout the history of science. Science teachers are a part of society, they have their experience and opinions, which are always more or less biased. Such attitudes must, of necessity penetrate science instruction, just as any other academic field. The considerations and discussion leading to these conclusions are interesting from a political and social point of view.

instruction + biology, natural science, preparations for instruction, bias - 147307.

381

484. LAZAROV, D.M.:
Svrzane na obuchenieto po biologiya a selskostopanskoto proizvodstvo (Combining biology instruction with agricultural production)

The main task of socialist school is to prepare the comprehensive and harmonious development of the personality for life in a developed socialist society. One of the means of achieving this is to combine instruction with production, for instance attaining knowledge in biology through gaining the practical skills and knowledge needed for agricultural production. Also agricultural crops are a factor in ecology and without knowledge of this science it is impossible to increase crop yields and to increase the efficiency of agricultural production. Pupils gain knowledge in elementary pedology in the 4th class. They participate in ploughing the soil, planting seeds, cultivation work, etc. and thus become acquainted with the optimum conditions plants require for their growth. In practical work on the school plot of land they learn about the relationship between cultivating the soil and the physical properties of the soil, the biological characteristics of various plants, their fertility and requirements. The author deals in detail with some topics from the teaching syllabus for the 5th to 8th classes which are related to agro-biology and shows how practical and theoretical instruction can be combined.

instruction + biology, preparation for instruction, theory and practical work, agricultural work - 147307.

485. VITKOVA, M.:

Izuchvane materialite na dvanadesetiya kongres na BKP v urotsite po biologiya (A study of the documents of the XII Congress of the Bulgarian Communist Party in biology instruction)

Biologiya i khimiya, 24, 1982, No.   , pp.

On the basis of the example of the topic "Plant selection - methods used in crop production" the author describes how pupils in the 10th class are taught about the tasks which Bulgarian agriculture has. These tasks concern above all increased crop production and the cultivation and wide-spread use of high-quality strains and varieties. Also such topics as "Selection methods used in animal husbandry", "The development of the individual plant", and "The foundations of ecology" provide the teacher with opportunities to discuss current topics in the light of the documents of the XIIth Party Congress. Pupils also become acquainted with specific data concerning the development of agriculture and the tasks of society in relation to nature conservation and environmental control.

instruction + biology, preparations for instruction, agricultural production, nature conservation, environmental control - 147307.

486. WANDERSEE, J.H.:

Humor as a Teaching Strategy

The American Biology Teacher, 44, 1982, No. 4, pp. 212-218. 5 figs., 2 tabs.

The author discusses the use of humor in instruction. He characterises humor and its contribution to students' perception, its various forms, etc. He also provides specific instructions on the use of humor in the teaching of some topics. Tables provide a survey of sources of humor and its forms and definitions. Illustrations show cartoons which are related to biology. Humor has the ability of providing an incentive for more intensive study.

instruction + biology, preparations for teaching, humor - 147307.

12.21 Preparations for botany instruction

487. ALBRECHT, G.:
Einflüsse des Waldes auf den Wasserkreislauf. Eine problemorientierte Unterrichtseinheit für die Klasse 6 der Hauptschule (The influence of the forest on the circulation of water. A problem orientated teaching unit for the 6th class of basic school)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 7, pp. 233-239, Lit. 6, 6 figs., 1 test, 1 outline.

A didactically planned teaching unit concerning the circulation of water in relation to the forest. Its aim is to acquaint pupils with this problem and to educate them towards knowing how to deal with various life situations: this is the most important motivating force for learning. The objective of this instruction is education for environmental control and nature conservation, as well as gaining a sensitive attitude towards the forest. A detailed factual analysis of the problem acquaints pupils with relations among various phenomena. The unit is divided into 9 teaching lessons: 1) reductions in the size of forest lead and changes in the environment, increased soil erosion and a decrease in the humidity of the air; 2) the forest as a water reservoir; 3) the canopy of foliage in the forest slows down the penetration of water into the soil; 4) moss and the mixture found on the forest floor protect the soil against erosion; 5) forest undergrowth and mosses capture water and prevent its running off; 6) the evaporation of water from a forest increases the humidity of the air; 7-9) the circulation of water and forests.

instruction + biology, preparations for teaching, problem teaching, circulation + water, living communities, forest - 147307.

488. BARDELL, D.:

Bacterial Photosynthesis Without Chlorophyll

The American Biology Teacher, 44, 1982, No. 5, pp. 278-285.

Photosynthesis is necessary for all forms of life. Plants and some kinds of bacteria carry out photosynthesis and have chlorophyll in their cells. Bacterial chlorophylls, however, differ in some chemical detail one from another and from plant chlorophyll and are called bacterial chlorophyll. In recent years the discovery has been made that Halobacterium halobium carried out photosynthesis, but without bacterial or plant chlorophyll. In this bacteria a molecule sensitive to light called rhodopsin is found in the cellular membrane of the bacterium.The author discusses this discovery and the specific aspects of photosynthesis in rhodopsin.

instruction + biology, preparations for teaching, plant physiology, photosynthesis, plant, bacterium - 147307.

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489. BOJANOWSKI, J.:
Nauka o dziedziczności i sztuka hodowli roślin
(The science of heredity and plant cultivating skills)
Biologia w szkole, 35, 1982, No. 3, pp. 160-163.

Genetics makes it possible to cultivate new varieties which have a high utility for man. The best possible environment should be found for each new plant variety. Genetics as a science is about 100 years old, whereas practical cultivation experience is as old as agriculture. Practical skills have brought man to the development of a science of heredity. In the course of development, science always tends to forge ahead of practical work and point to new opportunities. The first step in improving crop plants is the selection of the best individuals for cultivation. The discoveries of Mendel, Vries, Correns, Tschermak and Bates have brought important new knowledge. The success of cultivators can be demonstrated on the work of Louise de Vilmorin, who for 12 years cultivated sugar beets with a very high sugar component. Johannsen formulated the theory of pure lines. It was found that selection is possible only if specific changes are taking place in a population. Each hybrid represents a new combination of genes and makes selection possible. A prerequisite for successful cultivation is the creation of a precise cultivation objective and its prerequisites and thus knowing which characteristics to cultivate and which to supress. Regional and international gene banks are being developed. Selected pairs of parents are cross-bred. Sometimes more than two forms are cross-bred and thus compound individual organisms develop. The cross breeding of some plants is very simple, while with others it is a very complicated task (for instance clover, the kidney bean or the soya bean). Hybrids can be reproduced only through self-pollination. In the F_2 generation new phenotypes develop and artificial selection is carried out. The selection of a larger number of characteristics which are considered important require a larger number of individuals in a population. The criteria which make it possible to eliminate unwarrented forms are very important, as well as decreasing the number of individuals used for a study. Even minimal selection must be carried out on the basis of several hundred individual organisms. The author also discusses some other aspects of this problem, for instance vegetative propagation, heterosis and polyploid tissue or cells.

instruction + biology, genetics, preparations for teaching - 147307.

490. DENISIUK, Z.:
Step jako środowisko ladowe (The steppe as a terrestrial environment)
Biologia w szkole, 35, 1982, No. 1, pp. 5-16, Lit. 8, 6 figs., 1 tab.

The steppe represents an important type of environment for plant communities in the more arid areas of the Earth. The steppe is more or less flat, with little rainfall, it is not subject to floods, has no marshland or peat bogs. During the whole vegetation period it is covered with plants. In some places steppe biotas can also be found in the vicinity of rivers and their valleys. Besides grasses, also viviaceous plants grow in the steppe. The soil is black or brown earths. Meadows differ from the steppe by their higher share of viviaceous plants; meadows are usually secondary

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anthropogenic biotas and are usually cultivated. They also tend to be unstable communities with a succession of species which are influenced by human intervention and the intensity of grazing. The steppe is a more stable community, which is not subject to ecological succession. In conclusion the author describes the steppe areas found on various continents. Asia has the largest percentage of steppe (35.38 %) then comes Africa (28.63 %), North America (12.5 %) Australia and Oceania (11.85 %), South America (7.66 %) and the smallest of all, Europe (3.97 %). Also the quantity of rainfall in the steppe is discussed.

instruction + biology, phytogeography, preparations for teaching, plant community, steppe - 147307.

491. DIEKJOBST, J.:
Waldgesellschaften im Unterricht (Forest communities in class)
Praxis der Naturwissenschaften im Unterricht - Biologie, 31, 1982, No. 8, pp. 238-244. 2 figs.

The author first describes the specie composition of a natural central European forest. This composition is the outcome of the various competitive force of different species of trees and shrubs. Competitive force influences conditions at a specific location, including the amount of water in the soil, the acidity of the soil and the amount of nutrients it contains. Beeches have a special position; they form silicate beech forests or calcium beech forests. They also often form communities with birch and alder (coastal forest). At present strongly and weakly competitive trees exist. There are about 30 different species of trees in these forests which combine to form 45 different types of forest communities. The author describes in detail a beech silicate forest, a beech calcium forest, birch-oak communities, alder coastal forests, thermophilous forest communities, etc.

instruction + biology, ecology, sociology + plants, phytocoenoses, forest - 147307.

492. DZURA, M.:
Środowisko ladowe - Konspekt lekcji w klasie IV.
(A terrestrial environment - the outline of a lesson)
Biologia w szkole, 35, 1982, No. 1, pp. 41-42.

In this lesson a comparison is made of the conditions for life which organisms living in the steppe and in the desert have, with special stress on the influence of the environment upon an organism. The objective of the lesson, besides the above mentioned aspects, is also an excercise in logical thinking and to arouse in pupils an interest in reading popular science literature. The most important methods of instruction used are a discussion and independent work done by pupils. The media used include photographs and pictures of desert and steppe plants and animals. The author describes the course of the lesson and provides suitable questions for the discussion.

instruction + biology, ecology, preparation for teaching, instruction mthods, discussion - 147307.

493. FLETSCHER, M. - OSBORNE, G.:
A Demonstration of Density Dependence in the Reproductive Capacity of the Bulbous Buttercup
The School Science Review, 63, 1982, No. 224,
pp. 476-478. 1 fig., 1 tab.

The author describes the findings of a three-year project to study the influence of the density of the Bulbous buttercup (Ranunculus bulbosus) upon its ability to reproduce in a specific environment. In the project first part of a meadow where the plant grows was divided into small squares (20 x 20 cm) and the number of blooms counted. These and other characteristics of the plants in three consecutive years were written into tables which were then mutually compared. The data was then summed up. This excercise is suitable for school outdoor excursions.

instruction + biology, ecology, preparations for teaching, field work, observations - 147307.

494. CHMIELEWSKA, B.:
Plechowce (Thallophyta)
Biologia w szkole, 35, 1982, No. 2, pp. 96-99. 1 fig.

The author provides methodological instructions on teaching the topic cited in the title. First a survey of the subject-matter is provided and then a didactical game in which 5 tasks are given to pupils is described. A pupil receives 2 points for correctly fulfilling each task. Among the tasks are for instance pictures of Thallophyta which pupils are asked to divide into groups of bacteria, algae and fungi. Another task concerns classifying pictures of plants into groups, including unicellular and multicellular or according to the source of nutrition of the plant

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(parasites, autotrophic and heterotrophic plants), aquatic and terrestrial plants, according to their method of reproduction atc. The author provides detailed descriptions of the game and how it can be played by groups of pupils.

instruction + biology, botany, thallophyta + plants, didactical game - 147307.

495. ILYUSHINS, I.T. - ISAYEVA, R.J. - MASLOVA, P.V. - NIKOLAYEVA, E.S. - SERBRYAKOVA, A.N.:
Oznakomleniye uchashchikhsya s materialami XXVI. syezda KPSS na urokakh botaniky (Acquainting pupils with the documents of the XXVIth Congress of the Communist Party of the Soviet Union in botany lessons)
Biologiya v shkole, 56, 1982, No. 1, pp. 27-30.

A study of the documents of the 26th Congress of the Communist Party of the Soviet Union is an important task for all teachers, including biology teachers. The authors here first provide a bibliography of articles and papers concerning these problems which have already been published. Then specific examples are provided concerning the study of these documents in botany lessons. They mostly concern the tasks which the Congress set for the development of agriculture, for science and for nature conservation and environmental control. For instance the topic "The cell" can include the tasks and objectives of science as set by the Congress, while the topic "Roots" can be discussed from the point of view of the tasks set by the Congress in the area of land reclamation and improving the fertility of the soil where there are less positive conditions for agriculture.

instruction + biology, botany, preparations for teaching, XXVI Congress of the CP of the SU, agriculture, science, research, nature conservation - 147307.

496. JANIN, C.L.:

Animali e vegetali in primavera (Animals and plants in the spring)

Scuola e didattica, 26, 1980-1981, No. 14, pp. 36-37. 3 figs.

The author provides suggestions for carrying out observations both outdoors and in class, such as for instance observing buds, seeds (their structure, horizontal and vertical cuts, etc.), the early stages of growth and germination, comparisons between different species, etc. The observation of animals in the spring is more difficult and in urban areas the only possibility often is a visit to the zoo, but some frequently found species can be observed directly, for instance the building of nests by birds, etc.

instruction + biology, preparations for teaching, excursions, observations - 147307.

497. JANIN, C.L.:

I vegetali affrontano l'inverno (How plants survive the winter)

Scuola e didattica, 26, 1982, 1980/1981, No. 5, pp. 25-26. 3 figs.

The author recommends organizing observations during autumn excursions of pupils to learn how leaves become yellow and then fall. An interesting problem for pupils to solve is whether the yellow pigment seen in leaves in the autumn is present in the leaf during the whole period of vegetation, or whether it develops as a consequence of cooler weather. The solution can be found in a book (Miller-Blaydes: Metodi i materiali pel l'insegnamento della scienze biologiche) which describes an interesting experiment to decide this problem. Other experiments described in the article explain why leaves fall, why smells change, etc.

instruction + biology, preparations for teaching, excursions, observations, experiments, physiology + plants, chlorophyll - 147307.

498. JANIN, C.L.:
Simpatie e antipatie tra la piante (Sympathies and antipathies among plants)
Scuola e didattica, 26, 1980-1981, No. 11, pp. 23-24.
2 tabs., 1 fig.

Here the author describes lessons to explain the difference between the natural environment of a plant and an environment provided by man, the advantages and disadvantages of monocultures, loss of equilibrium in nature, the proliferation of pests, etc. Also relations between plants of different species in an environment are discussed and so-called sympathies and antipathies between specific species of plants. Pests are usually combated by chemicals, but this can also be achieved by making use of the relations which exist between specific plants or between plants and animals.

instruction + biology, preparations for teaching, environment + plants, natural equilibrium, man - 147307.

499. KAPUSTINA, M.S.:
Iz opita prepodavaniya temi "Razvitie rastitelnogo mira na Zemle" (Experiences with teaching the topic "The development of the plant world on Earth")
Biologiya v shkole, 56, 1982, No. 2, pp. 21-26.

The topic concerning the development of plants on Earth takes up 4 teaching lessons. The author here provides detailed analyses of these lessons. First the historical stages of development of plants are described, the creation of cultivated plants by man and the success of Soviet Science in the selection and cultivation of new crop plants. The author takes the regional principle into consideration and explains which plants in the Moscow region are influenced by man, why the number of pteridophyta is steadily declining, why the number of existing plant species is also steadily declining and why this fact should be a source of worry.

instruction + biology, preparations for instruction, botany, phylogeny + plants - 147307.

500. KÜHLER, H.:
Zur mikrobiellen Assimilation und Dissimilation des Stickstoffs im Boden (On the microbial assimilation and dissimilation of nitrogen in the soil)
Praxis der Naturwissenschaftn - Biologie, 31, 1982, No. 7, pp. 207-219. 2 figs., 5 texts, 3 outlines for experiments, 1 tab.

This article is a continuation of an article by the same author published in this magazine in issue No. 6 of this year. The first part of the article deals with the same topic and describes expriments which can be done in school, and which are suitable for the independent work of pupils. The experiments are divided into those which are done before the whole class, individual experiments and group experiments. The experiments include finding proof of the presence of carbon and hydrogen and analysing the composition of ash from burnt biomass. The production of CO_2 and the forming of ammonia occurs in non-sterile soil. Micro-organisms which mineralise organic substance into carbon and nitrogen can be isolated from the soil, etc. Also a long-term experiment is described concerning the speed of mineralization and the immobilization of nitrogen in the soil.

instruction + biology, microbiology + instruction - 147307.

501. MARTIN, F.S. et al.:
The Stomatal Mechanism - Some Recent Developments
The School Science Review, 63, 1982, No. 225, pp. 459-468. 5 figs.

Almost all plants are capable of movement, which is accomplished by their leaves or tendrils, etc. but the mechanism of these movements has not yet been clarified in a satisfactory manner. The author provides a survey of some findings 100 years old and deals in detail with the role of potassium and malic acid in the stomatal mechanism. In conclusion he discusses photosynthesis which occurs in sphincter cells and the function of chloroplasts in them.

instruction + biology, physiology + plants, movement + plant - 147307.

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502. POSER, G.:
Der Einsatz des Mikroskopes im 5. Schuljahr - Zellen, Bausteine der Lebenswesen (The use of the microscope in the 5th class - cells as the building stones of living organisms)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 9, pp. 323-333. Lit. 7, 5 figs., 4 worksheets, 1 tab.

The author discusses the possibility of using microscopes already in the 5th class when the topic "Cells - the building stones of living organisms" is taught. This topic provides a good opportunity to acquaint pupils with microscopes. In a research project, pupils were given tests to verify their knowledge after 9 lessons taught on this topic, which indicated that those pupils who used a microscope achieved better knowledge of the subject-matter. The nine lessons contained the following subject-matter: an introduction to the function and structure of a microscope and its use, using a microscope, microscopy of an onion section, why are plants green, the observation of waterweeds and their cellular structure, animals are also made of cells, animal and plant cells differ. In the final lesson pupils sat for a final test, which was compared with a preliminary test given before the beginning of teaching this topic.

instruction + biology, preparations for teaching, microscope, botany, cell + plant, 5th class, basic school - 147307.

503. RAO, K.K. - HALL, D.O.:
Photorespiration
Journal of Biological Education, 16, 1982, No. 3,
pp. 167-172. 4 figs.

In many plants the amount of carbon dioxide exhaled and the amount of oxygen inhaled is higher in the light than in darkness. The fact that plants intake oxygen predominantly in the daytime is called photorespiration. The bio-chemistry of this photorespiration differs from respiration in the darkness, which is linked to STP in the cellular process. Respiration in the dark takes place in mitochondria, while photorespiration occurs through chlorophyll light reactions. Respiration in the dark provides energy needed for the plant's metabolism. The author describes in detail the bio-chemistry of photorespiration, which is connected with the Kalvin Cycle. In some plants photorespiration does not take place. The author also considers whether photorespiration is to the advantage of plants and the connection between photorespiration and photosynthesis.

instruction + biology, botany, preparation for instruction, photorespiration - 147307.

504. RISCHER, H.:
Vorschläge zur Einführung der Schüler in physiologische Sachverhälte in Klasse 8 (Suggestions for introducing pupils in the 8th class to problems of physiological problems and phenomena)
Biologie in der Schule, 31, 1982, No. 9, pp. 357-359.

Teaching problems connected with physiology deserve maximum attention and preparations on the part of the teachers. Metabolism is a new term which requires that pupils synthetise their previous knowledge concerning the intake of food and respiration. These notions should first be broken down into partial notions and terms (for instance the input and output of substance). In the lesson itself new notions and terms are added to form a whole system.

instruction + biology, physiology, preparing for teaching, 8th class, basic school - 147307.

505. SCHMIDT-MARLOH, D.:
Der Wasserhaushalt des Waldes (The water economy of a forest)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 1, pp. 1-12, 1 fig., 5 worksheets, 3 transparencies.

The article analyses problems concerning the water economy of a forest for use in the 6th class of basic school. The topic is divided into 8 lessons. Spruce monocultures are compared to mixed forests, with the purpose of explaining the importance of forests not only from the point of view of the landscape but also for man. The scientific and technological revolution and its consequences are proving to be a burden upon the environment, causing damage to ecosystems. This in turn leads to demands for environmental control and nature conservation. Pupils should acquire detailed knowledge of some eco-systems so that they can better understand the importance that they have for man and the dangers which follow from a loss of environmental equilibrium. The author deals with the problem from the point of view of the teaching syllabi used in the Hessen land (FRG), which stress the importance of the forest and waters. A drop in the level of the water table threatens the whole ecosystem. The author demonstrates this on the basis of various examples. Simple experiments serve to illustrate the importance of water for this ecosystem. The author also explains the characteristics of forest plants and the composition of various types of forests, the influence of monocultures, how rain water is transformed into drinking water by the forest, the forest as a reservoir of drinking water, how mosses hold water, the importance of evaporation of water by forest plants and the importance of the forest for the local climate.

instruction + biology, ecology, eco-system, forest, preparations for teaching, 6th class - 147307.

506. STRONCK, D.R.:
Teaching Succession with Forests
The American Biology Teacher, 44, 1982, No. 1, pp. 44-47,65.

Succession is a basic ecological notion. It concerns the changes which occur in the plant composition in a given locality in the course of a specific time. So far succession has been described in greatest detail in a pond. On the basis of his own experience the author stress the suitability of studying this problem in a forest, because here the specie diversity is larger and the subject-matter more readily accessible. He provides detailed instructions for carrying out this type of project. Students collect data on the basis of instructions from their teacher and require very few aids or instruments.

instruction + biology, ecology, preparations for teaching, plant communities, forest - 147307.

507. SZURA, H.:
Środowisko ladowe (Lekcja powtorzeniawa w klase IV.)

(A terrestrial environment - a lesson for repetition)
Biologia w szkole, 35, 1982, No. 1, pp. 38-41.

This lesson for repetition is organized as a competition for 4 groups of pupils. The knowledge gained concerning a terrestrial environment is recalled. Each group selects one of its members to answer a question. Answers receive points (from 1 to 5) according to the quality of the reply. Points are subtracted for prompting. The author describes in detail how the game is played and how pupils' knowledge is assessed.

instruction + biology, ecology, preparations for teaching, repetitions, didactical games, didactical tests - 147307.

508. WEBER, R.:
Laubfall und Fallaub. Eine Materialiensammlung zum Biologieunterricht (The falling of leaves and fallen leaves - collection of materials for biology instruction)
Naturwissenschaften im Unterricht - Biology, 30, 1982, No. 10, pp. 358-360.

The falling of leaves from deciduous trees is influenced by internal, as well as external factors and provides interesting opportunities for pupils to carry out observations. When for instance during fruit picking a branch is broken, the leaves on the branch will dry, but will not fall off. But in the autumn, leaves fall even when there is a very slight wind, while during the vegetation period they will hold fast even through a windstorm. The author describes the physiology of the growing and falling of leaves, the covers of buds, etc. Trees of the same specie do not shed their leaves all at the same time; the crowns of trees in the close vicinity of street lamps keep their leaves for longer then the rest of the tree. Leaks in gap pipes cause a loss in the amount of water delivered by the roots and thus a more rapid shedding of leaves. Also CO_2 from chemical plants causes trees to shed their leaves more rapidly. Rhizomes growing from dormant buds or branches are interesting because these later, new leaves are not shed at the normal time; they freeze but remain on the tree until the next autumn when a cork layer is formed. The "leaves" of evergreen trees remain on the tree for several years (The Scotch pine for three years and the fir for 7 years). The author describes the physiology of the changes taking place in the leaves, why they become yellow or red and other changes in pigments. Also the changes which take place in fallen leaves are described. Fallen leaves provide very good thermal isolation, prevent the rapid evaporation of water or too rapid changes in the temperature of the soil. They also provide a suitable environment for soil fauna. On the other hand a number of pests also find a home in fallen leaves and the opportunity to survive the winter.

instruction + biology, physiology + plant, preparations for teaching, leaves, chlorophyll - 147307.

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12.22 Preparations for zoology teaching

509. **ADAMS, C.:**
Wildlife Resources Applied to Contemporary Goals
The American Biology Teacher, 44, 1982, No. 4,
pp. 224-228, 253. 6 figs., 2 tab.

The article describes cooperation between high school students and Wildlife Fund rangers. The students participated in a project aimed at determining the relation between the age and the reproduction capacities of dead female coyotes on the basis of post mortems of the dead animals. The data was then compared to the data found in the relevant literature and conclusions drawn on the influence of human intervention on the coyote population and their reproductive capabilities. The coyote carcasses were obtained from fur traders, where the students at the same time learnt how to skin a coyote. The students also studied disease found in the animals and their causes. When visiting the wilderness where coyotes are hunted the students also interviewed old hunters in the area to learn as much as possible about former practices in this area.

instruction + biology, zoology, preparations for teaching, excursions, hunting, wildlife - 147307.

510. **ALTMANN, A.:**
Mořské ryby ve výuce zoologie v 6. ročníku základní školy (Sea fish in zoology instruction in the 6th class of basic school)
Přírodní vědy ve škole, 33, 1981-1982, No. 5,
pp. 162-166, 14 figs.

The article provides information for teachers for preparing the topic "The economic importance of sea fish", which is taught in the 6th class of basic school. The textbook cites only the Atlantic herring, Pilchard sardine, the cod fish, the Atlantic mackerel and the Atlantic salmon. The article extends the number of fish dealt with and provides their characteristics, morphology, diacritical signs, biology and economic importance. Specifically it deals with the Clupeidae (the Atlantic herring, the Shelf herring, the Baltic herring, the Baltic sprat or Brisling, the Black sea sprat, the Pilchard sardine), the Egraulidae (Anchovy), the Scombrides (the Atlantic mackerel, the Japanese mackerel), the Thunnidae (Tunny fish and the Atlantic bonoto), the Gadidae (the cod fish and Whitling) and the Salmonidae (the Atlantic salmon). These fish from European seas are imported to this country fresh, frozen or canned. The information provided is meant to improve the motivation of pupils, to prepare the teacher for answering pupils' questions and to enable him to prepare interesting pictures and teaching media.

instruction + biology, zoology, preparations for teaching, fish, sea - 147307.

511. BADE, L.:
Blikzeichnen der "Glühwürmchen" ein Unterrichtsmodell zum Thema Kommunikation im Tierreich (The light produced by the European glowworm - a model teaching lesson on the subject of communication in the animal kingdom)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 10, pp. 304 -314.

The author explains the optical communication system used by animals on the basis of the example of the glowworm. He explains the biochemical essence of the light produced, which can also be demonstrated on the basis of a suitable biological and physiological experiment. The lesson can be based either on pictures and charts or on original object. Also a dummy can be used to demonstrate specie specific codes used by the glowworms. The author deals specifically with three species of glowworms: Lympyris noctiluca, Phausis splendidula and Phospaenus hemipterus. In Europe there are about 30 species of glowworms and throughout the world app_roximately 1800 species. In some species the signal is produced only by females, while in others both by males and females. The larvae and eggs of most specie also produce a light: the larvae attract their prey with the light (limacina) and the light produced by the eggs probably serves to regulate population density, since the eggs require at least 30 cm of space. In some species there are 5 times as many males as females. The glowing light is a type of "cold" light based on the substrate luciferine, the enzyme luciferase and the effect of oxygen, ATP and Mg^{2+}. The light produced has a wave length of 510 to 670 mm. The glowworms fly from the beginning of June until the end of August, with the largest numbers seen from the middle of June until the middle of July. Both the insects and their larvae are predators who hunt mostly small limacina. Large numbers are found especially in areas rich in calcium. The author describes the biology of the glowworms and an interesting experiment with cold light, the bio-luminescence of insects and experiments with dummies.

instruction + biology, zoology, insects + luminescence, preparations for teaching - 147307.

512. BELL, B. - BARKER, M.:
Towards a Scientific Concept of "Animal"
Journal of Biological Education, 16, 1982, No. 3, pp. 197-200, 5 figs.

The author finds that many students in secondery school have difficulty with the notion of "animal". Many of them are convinced that man, worms, spiders and other organisms are not "animals". He therefore organised a team of 16 biology teachers from various schools and held discussions with groups of students concerning the terms "animal" and "plant". The students were then asked to show on drawings at least 10 animals. The author discusses the findings of the project and comes to the conclusion that a teacher should thoroughly discuss the terms and notions which may seem simple, but in fact are not and where misconceptions can lead to accumulated errors in learning and understanding.

instruction + biology, preparations for teaching, notion + forming, animal - 147307.

513. BLECKMANN, H.:
Beutelbkalisation, Feindvermeidung und innerartliche Kommunikation mit Hilfe von Oberflächenwellen des Wassers (The localisation of prey, protection against enemies and intra-specie communication with the aid of surface waves on the water)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 1, pp. 44-51, 7 figs., lit. 40.

Surface waves on the water serve predacious species of insects, as well as a number of fish and amphibians for the localization of their prey. The waves are percieved by the animals even when they themselves are under the water. The article provides specific examples for all the above cited animals, which is supplemented by basic knowledge from physics which explains the problem and provides an interdisciplinary approach to the problem. The author explains the mechanism which makes it possible to localize the direction of the source of the waves and makes it possible for the animal to estimate distance, as well as its ability to distinguish waves caused by the prey and those cause by abiotic or other biotic interference. The cited examples can be used directly in instruction.

instruction + biology, zoology, preparations for teaching, insects, interdisciplinary relations - 147307.

514. BRAUNER, k.:
Die Angepasstheit des Springwurmwicklers an den Lebensraum Weinberg. Sachanalyse und methodisch-didaktische Hinweise für den Biologieunterricht der Sekundarstufe I in Weinbaugebieten (The adaptability of the leaf-roller moth to conditions in vineyards. A factual analysis and methodological and didactical instructions for biology teaching in the lower classes of secondary school in wine growing areas)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 9, pp. 333-340. Lit. 3, 2 worksheets, 7 figs.

The author shows how to make full use of the regional principle in biology teaching, specifically in areas where grapes are cultivated. The biology of the vine leaf roller moth, one of the most typical and widely spread insect pests found in these areas is studied as a biology project. The author describes Spartganothis pilariana DENIS et SCHIFFERMÜLLER, 1775, a small moth of the Tortricidae family, which is about 1 to 1.5 cm long and has a wingspread of 2 - 2.5 cm. The moths are active in the evening and at night, in July and August, while during the day they hide on the leafs of grapevines. They are usually found in large numbers and during 11 days each female lays about 150 eggs covered with a white secretion on the upper side of grapevine leaves. The caterpillars hatch in two weeks and they survive the winter in the whitish tissue found on grapevines three or more years old. They withstand frost of up to minus 25 degrees Centigrade. After hatching, the caterpillars leave their hidding place and dig into the young buds which they eat hollow; after 40 to 45 days the caterpillar begins to moult and in 12 to 18 days a moth emerges. This is a very dangerous pest. The teaching syllabus recommends teaching the biology of the bark beetle, but in grape growing areas this insect is much better suited for school instruction.

instruction + biology, preparations for teaching, regional principle, vineyards, cultivation + pests, insects - 147307.

515. BROVKINA, E.T. - REZNIKOVA, V.Z.:
Metodicheskiye rekomendatsii k izucheniyu v kurse zoologii temi "Prirodniye soobshchestva i okhrana zhivotnogo mira". (Methodological instructions for teaching the topic "Natural communities and animal conservation" in zoology lessons)
Biology in school, 56, 1982, No. 1, pp. 40-45.

The authors provide detailed methodological instructions on how to teach the topic cited in the title. These instructions have been created because recently changes have been introduced into the teaching syllabus. Zoo-geographical aspects have been transfered to the geography course; the textbook in use was, however, written according to the old version of the syllabus. The authors provide an outline for teaching this topic, recommend problems for assignments to give to pupils, etc.

instruction + biology, zoology, living community, nature conservation - 147307.

516. HINTERMEIER, H.:
Hühnerhaltung einst und heute - eine exemplarische Unterrichtseinheit zur Problematik der gegenwärtigen Massentierhaltung (Chicken breeding in earlier times and at present - a model topic for use in teaching problems of modern animal breeding)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 4, pp. 127-139. 13 figs., 1 worksheet, 1 information sheet, lit. 26.

Domestic animals are now bred on a mass scale which brings a number of economies. Thus modern methods of breeding chickens use cages in huge batteries. This type of breeding has led to objections, especially on the part of ethologists, who say that a chicken remains a chicken even in a cage, although it is unable to peck, scratch, strech its wings, move around, run, practice a pecking order, clean its feather in the dust, etc. As a consequence of this chicken's behaviour changes, they eat their feathers, practice cannibalism, their feet are deformed, they lose their neck feathers, are often wounded, their bones suffer from calcium loss and from paralysis. Often chickens suffer complete mental breakdowns. The article sharply criticises this type of large scale breeding where people completely ignore the fact that the chicken is a living organism which has specific demands on the environment; this is done in the name of mechanisation and automation.

instruction + biology, zoology, preparations for teaching, use of examples, breeding of farm animals - 147307.

517. CORE, E.V.J.:
Teaching Taxonomy: A Different Approach
The American Biology Teacher, 44, 1982, No. 9, pp. 547-548. 1 fig.

Taxonomy is a topic in high school biology which causes great difficulties for students.Learning by rote is not sufficient for really learning the classification system for plants and animals. The author has developed a diagram, which shows individual systematic categories such as the phylum, class, crder, kingdom, etc. Students, on the basis of suitable questions, are led to decide where a specific organism is to be found within this diagram. In a similar manner practical knowledge in taxonomy can be tested.

instruction + biology, system + science, diagram, didactical game, preparations for instruction - 147307.

518. DIRCHSEN, J.:
Der Seehund - ein Beispiel für die Angepassheit an das Leben im Wasser (The Common seal-an example of adaptation to life in the water)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 5, pp. 187-190. Lit. 8, 2 figs., 1 picture table

The author deals in detail with the Common seal (Phoca vitulina), a topic which can be used in biology instruction in the 5th and 6th classes. These animals belong to the order Pinnipedia; 4 different sub-species are known. On the seacost of the FRG lives Phoca

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vitulina vitulina. The length of its body is between 135 and 185 cm and it weighs from 60 to 100 kilograms. The author stresses those aspects of the animal which demonstrate how well it is adapted to life in the water. Pupils should visit the zoo and then in class discuss the structure of the seal´s body in view of its life in the water, the covering of its body, how it moves, its respiration, food and reproduction. It is also interesting to learn about the life of this animal on land, where recently on the basis of extensive observations many new facts have been discovered. Seals have been marked and they have been observed from the air. Seals living in the mud flats are members of a single population. In 1978 there were 3059 of these animals in the FRG. Scientists have been studying their dermatological diseases and their parasites which are found in large numbers as the result of environmental pollution, especially with heavy metals and chlorinated carbohydrates.

instruction + biology, zoology, preparations for teaching, mammals, Pinnipedia - 147307.

519. GILBERT, S.:
Surface, Volume and Elephant´s Ears
The Science Teacher, 49, 1982, No. 9, pp. 14-20, 4 figs. 4 tabs.

Living and non-living objects are linked to their environment by the surface of their bodies. A permeable or non-permeable, a smooth or rough body surface determine the mutual interaction which exists between an organism and its environment. The author here concentrates on the way in which the surface of the body reacts to changes in the environment. In this context she explains the function of a polar bear's ears, as well as the ears of a mouse and an elephant which all serve not only for the perception of sounds, but also other information. The author also makes suggestions for assignments in microbiology, where the surface of the body of a bacterium determines its chance of survival in a specific environment.

instruction + biology, microbiology, zoology, environment, structure + body + organism - 147307.

520. GRIBENSKI, A.:
Documentation sur les champs visuels des animaux
(Documentation concerning the field of view of animals)
Biologie, Géologie, 69, 1982, No.1, pp. 227-231. 8 figs.

The author compares the field of view of man and some animals, for instance a horse, pigeon, swallow, etc. He distinguishes panoramatic views of eyes found on the side of the head (horse, pigeon) and stereoscopic views when the eyes are on the front of the head (man, primates). Birds of prey have stereoscopic view. Very often the type of sight is in direct connection with the way of life of the animal. Monocular and biocular sight are explained with the aid of diagrams.

instruction + biology, zoology, sight, preparations for teaching -147307.

521. HIGGINS, R.C.:
Predation of Notophilus on Collembola as a Predator-Prey Teaching Model
Journal of Biological Education, 16, 1982, No. 2, pp. 128-130, 1 fig., 1 tab.

The author describes the observation in a school laboratory of the behaviour of the insect Nitiophilus of the family Carabidae and how its hunts the Folsomia candida of the order Collembola. Also the behaviour and defence of the latter insect can be observed.The whole process can be divided into the following stages: observation of the prey, approaching it, final reconnaissance, combat, victory or rejection; if the former, then chewing, rest and preparations for a new attack. All this can be observed on a Petri dish covered with crushed charcoal, so that both insects can be plainly seen.

instruction + biology, zoology, insects, preparations for teaching, observations - 147307.

522. JANIN, C.L.:
Gli animali affrontano l´inverno (How animals survive the winter)
Scuola didattica, 26, 1980-1981, No. 4, pp. 34-35, 1 fig.

The author provides an analysis of the following didactical steps taken in explaining the topic of how animals survive the winter: cold weather threatens the thermal regimen of an animal; how heat loss can be prevented; winter hiding places, hibernation, food during the winter, seasonal migrations. Pupils should recieve independent, assignments supervised by the teacher.

instruction + biology, zoology, physiology + animal, hibernation, model + instruction, preparations for teaching - 147307.

523. KOROLEVA, E.V.:
Ob Uchebno-metodicheskom komplekse po zoologii
(A methodological and teaching complex concerning zoology)
Biologiya v shkole, 56, 1982, No. 6, pp. 41-46.

The publishing house Prosveshcheniye has for some time been preparing methodological and didactical handbooks for a number of teaching subjects related to the general educational and teaching process. Their purpose is to help both pupils and teachers in instruction and requires their improved mutual cooperation, as well as improvements in teachers´ theoretical and didactical knowledge. The complex includes textbooks, notebooks for pupils, various aids and supplementary literature. The authors discuss in detail a new zoology textbook and the accompanying teaching manual for teachers. In conclusion further plans of the publishing house in this area are described for the subjects zoology and biology.

instruction + biology, zoology, preparations for teaching + zoology, teaching media, books for youth -147307.

524. KÖNIG, H.:
Das Thema "Saurier" im Unterricht der 6. Klasse
(The topic "Reptiles" in instruction in the 6th class)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 10, pp. 362-369. Lit. 16, 3 tabs. 2 models for transparencies.

In this analysis of the topic "Reptiles" from the point of view of its teaching, the author stresses a comparison of fossil and existing reptiles, their body structure and way of life. First extinct predator reptiles living in the sea are described; the Pteranadon was a flying reptile and the Sauropodus was probably an amphibian - it is not clear whether it lived in the water or on land. Pupils are usually very interested in these creatures,so museum visits should be organized, as well as the making of models, showing films or slides, etc. Modern paleontology has shown that the Pteranodon had a "wingspread" of up to 7 meters, had no teeth and on his skull had a large bony crest 70 cm long, which maintained stability in flight. In spite of the large size of this crest it weighed only 30 g. Its brain was similar to the brains of contemporary birds. According to most recent studies this was probably a thermophilous animal since it had a furry cover over its body - its wings have been found in some fossils. The Pteranodon had a membrane between its fingers, ate fish (fish bodies have been found in its fossilised crop). It was capable not only of swimming, but also flying into the air directly from the surface of the water. The bony crest of this animal does not have any existing analogy. The Sauropods have provided new knowledge concerning the structure of the skeleton of the extremities in these extinct reptiles: their bones were very massive and similar to those of contemporary elephant bones. Strongly ground teeth indicate that they ate hard food. New findings concerning the lungs of these animals indicate that they could not survive under water. They most probably did not live in the water, but rather on the shore of lakes and seas. Their fossils have, however, been found on land.

instruction + biology, zoology, preparations for teaching, reptiles, fossiles - 147307.

525. KRAWCZYK, I.:
Owady (Insects)
Biologia w szkole, 35, 1982, No. 2, pp. 93-96. Lit. 2, 13 figs.

The author analyses the topic Insects from a didactical point of view. First insects as pests are discussed - for instance the cabbage butterfly, the potato bug and the codling moth which attacks apples, as well as bark beetles which cause extensive damage to forests. The author recommends the use of problem teaching, didactical games and the use of various teaching media. A game called Protecting crop plants from pests is described.

instruction + biology, zoology, preparations for teaching, insects, didactical game - 147307.

526. KRAWCZYK, I.:
Owady pozyteczne. Konspekt lekcji w klasie VII
(Useful insects - the outline of a lesson in the 7th class)
Biologia w szkole, 35, 1982, No. 2, pp. 113-115. Lit. 5.

In the description of this lesson stress is placed on useful insects - for instance the Silk worm and its environment. Also problems connected with the conservation of various useful insects are discussed. The author recommends the use of panel discussions, films and didactical games. A bibliography of literature on this subject, both for pupils and teachers, is cited. Finally a discussion of the usefulness of ants in a park is described.

instruction + biology, zoology, preparations for teaching, insects, nature conservation - 147307.

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527. KRAWCZYK, I.:
Stawonogi (Arthropoda)
Biologia w szkole, 35, 1982, No. 2, pp. 88-92. 1 fig.

The author provides a didactical outline for a lesson on arthropoda. The purpose of instruction is to compare basic kinds of arthropoda: Crustaceans (crayfish or crabs), Araneae (spiders) and Insects (May-bugs). The purpose of the lesson is to become acquainted with important representatives of the Arthropoda, their economic importance and the need to conserve useful species and to combat pests. The basic teaching strategy should be problem teaching and the use of panel discussions, didactical games, the use of various pictatorial media, the observation of living and preserved specimens. The author describes a didactical game in detail.

instruction + biology, zoology, preparations for teaching, arthropoda, idactical game - 147307.

528. LINTZMEYER, H.:
Fortbewegung und Anpassung (Movement and adaptation)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 11, p. 378-387. Lit. 5, 1 tab., 3 worksheets, 8 figs.

This topic concerns the adaptation of animals to movement in relation to the varied environments in which they live and the food they eat. This exposition is based on the example of the movement and feeding habits of terrestrial animals. Movement is discussed in the context of finding food, the dependency of the speed of running of an animal, on the speed of movement of its prey, the force of gravity and the weight of the animal, as well as the resistence of the air. Another sub-topic deals with adaptation in relation to life in the air and in the water, the influence of resistence to movement on the shape of the body and its surface and limits to weight in flying. Movement is influenced by a number of factors including the evolution of movement mechanisms. The hunter and the hunted must achieve the same speed. The larger an animal is and the more capable of fighting back, the lower the maximum speed it must be capable of achieving (for instance elephants); the greatest speed is achieved by herbivorous animals who must run away from predators, while finding their own food requires low speeds. Well masked and small animals are potentially defenceless and thus achieve very high speed, but only for short durations of time; usually they need the added advantage of protective covering to survive (rabbits). A shark achieves a speed of only 50 km per hour, the sword fish and tunny fish 70 km per hour, a horse 60 km per hour, a rabbit and antilope 80 km per hour, the cheetah 100 km per hour, the swift flies 90 km per hour, the falcon and the starling 80 km per hour.

instruction + biology, zoology, preparations for instruction, physiology + animal, movement - 147307.

529. MACIEJOWSKI, J.:
Genetyka a hodowla (Genetics and animal husbandry)
Biologia w szkole, 35, 1982, No. 3, pp. 157-159. 1 tab., lit. 5.

Genetics are here discussed from the point of view of breeding farm animals, where the evolutionary process is speeded up so that results are achieved in several generations. Breeding changes the genotype, as well as phenotype of animals in the required direction. Thus both the quantity and quality of animals changes in a way desired by man, specifically as far as weight quantity of milk etc. are concerned. Sometimes aesthetical criteria are the objective of breeding - in homing pigeons, dogs, cats, etc. Very different breeds can be created, for instance the St. Barnard dog on the one hand and the Pinscher on the other or the Shetland pony and the Percheron can be cited as extremes in sizes of a single specie. Changes in colour, hide, feathers, the shape and size of the body can all be bred in a desired direction. All domestic animals are decended from originally wild animals.The motor of evolution among domestic animals is both natural and artificial selection. In each generation man does away with individuals which do not have the desired characteristics so that the chance of survival of the characteristics is not in accord with the proportional frequency of genes. Animal husbandry also makes use of mutations which have developed spontaneously in a population, which otherwise would be eliminated in nature, but are considered positive by man. In this way people have achieved significant breeding successes in a short time. For instance pastel coloured minks have been bred, as well as foxes and nutria. In mink over 100 genetically permanent colours have been bred. The migration of animals is very positive for breeding; exports and imports of breedimg animals are in fact an artificial form of migration. Thus animal breeding and natural selection are two related evolutionary processes.

instruction + biology, zoology, breeding + animals, animal husbandry, preparations for teaching - 147307.

530. MANNESMANN, R.:

Nahrungsketten und Nahrungsnetze im Wattenmeer (Food chains and food networks in coastal mud flats) Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 5, pp. 191-192. Lit. 2., 3 figs.

Food chains and food networks on the coastal mud flats can be studied during excursions and observations carried out in the course of field work. Two methods for the study of these ecological problems can be persued: either starting with a simple link in the chain and building up the structure of the chain or network, or proceeding centrally by studying the biology of a single organism. Special attention should be paid to the influence of man in this context. Difficulties often arise in this type of project which are connected with the need to have more information about the broader context of the way a specific organism lives than is generally available, including such aspects as how food is obtained, the density of a specific population, reproduction patterns, etc. The author specifically deals with two examples which are described in detail: one concerns the biology of the shrimp, the other a gradually built chain of food.

instruction + biology, zoology, preparations for teaching, food chains, food networks, sea + coast, excursions, observations - 147307.

531. NITSCHMANN, J.:
Fortpflanzung und Entwicklung der Tiere - Experimentalergebnisse bei Wirbeltieren und ihre Bedeutung für den Menschen (Reproduction and the development of animals. Experimental findings concerning vertebrates and their importance for man)
Biologie in der Schule, 31, 1982, No. 11, pp. 478-488.
2 figs., 8 tabs.

Embryology has become a highly developed science with a number of practical applications. The author first deals with bio-chemical interactions between the development of a tissue and organs (Spermann's experiments with induction and the biochemical structure of the inductors) and then with ontogenical and physiological experiments with mammal embryos. He explains the determination of sex in mammals, Y and X chromosomes and their significance, the development of the egg in mammals, the morula, embryoblast and trophoblast, blastocyste and the importance and limits or artificial fertilization (also in man), the technique used to manipulate the egg, vital staining, experimental parthenogenesis in mammals, the forming of chimaera in mice on the basis of cell cleavage and early embryos, an experimental analysis of twins, experiments with destroying one cell in two blastomeres, cancer and other process which occur in mammal cells.

instruction + biology, embryology, preparations for instruction, reproduction + animal, ontogeny - 147307.

532. NITSCHMANN, J.:
Fortpflanzung und Entwicklung der Tiere - Grundlagen und ihre gesellschaftliche Bedeutung (The reproduction and development of animals - their foundations and importance for society)
Biologie in der Schule, 31, 1982, No. 4, pp. 166-173.
1 fig., 9 photos.

A study of reproduction and the development of an individual makes an important contribution to understanding phylogenic problems and to solving practical problems, even those concerning man. The author first deals with cell division and the function of DNA and describes Gordon's experiments where an adult African frog was obtained (in 1-2 % of the cases) from the nucleus of cells from the intestine epithelium which were implanted into an egg without a nucleus. The notion of growth indicates a quantitative increase in organic substance, while the notion of development includes also qualitative changes. The author describes in detail the development of the egg of a sea urchin (cleavage, gastrulation, determination of various parts of the egg, influencing its development by various substances). In conclusion the artificial fertilization of trout is described, as well as the development of a bird egg and its practical implication.

instruction + biology, zoology, reproduction + animals, ontogeny, preparations for teaching - 147307.

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533. SHCHURKHAL, L.I. - KOMISAREV, B.D.:
Sinekologichen podkhod pri izuchvane kursa po zoologiya v svetskoto uchilishche (A synecological approach to the study of the zoology course in Soviet schools)
Biologiya i khimiya, 25, 1982, No. 4, pp. 17-27.

In zoology, pupils also become acquainted with the foundations of zoological ecology. Here they make use of knowledge gained in plant ecology, since plants serve as the food of animals. The primary organic substances found in plants are transformed by animals; at the beginning of each food chain or food network are plants and at its end large animals. To correctly understand the role of each group of animals in a biocoenoses the pupils can receive as assignments the making of diagrams to describe food chains and food networks. With each topic, the authors show how the given subject-matter can be used to explain ecological aspects and the need to conserve nature, so that natural equilibrium is not damaged. In conclusion the authors point out that a capitalist economy has much lesser prerequisites for thoroughly implementing the principles of nature conservation, in comparison to the socialist countries, where this is a common task for all strata of the population.

instruction + biology, zoology, ecology + animals, preparations for teaching - 147307.

534. TALESNICK, I.
A Few Facts about Sharks
The Science Tacher, 49, 1982, No. 3, pp. 13-14. 1 fig.

There are about 350 species of sharks which have been described. Their length is from 15 cm to 12 meters and the giant shark measures as much as 20 meters.

Only 12 to 20 species are dangerous to man. The author describes the structure of their bodies, their skin, teeth, sense of direction, life cycle and the dangers they pose to man, especially the White shark. However, these cartilaginous fishes are also useful because they clean the seas from waste and provide man with valuable raw materials, such as for instance shark skin, teeth, jaws, liver, fat and meat without bones which is very tasty and easily digestible. The author also describes sharks´ behaviour and their symbiosis with the small Pilot-fish. Sharks are sensitive to a bio-electrical field and are able to navigate according to the Earth´s magnetic poles.

instruction + biology, zoology, cartilaginous fish, preparations for teaching - 147307.

535. TENDEL, E.:
Bewegen - Fortbewegen. Zum Konzept des Themenheftes
(Movement and forward movement. Concerning the concept of a thematic notebook)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No.11, pp. 375-377.

The author suggests a teaching unit dealing with the movement of animals. Teaching syllabi and textbooks in use deal with movement in different contexts, from the point of view of general biology or monographically. The latter method teaches about the movement organs of animals, the skeleton of the extremities, the specialization of the mechanics of movement and the method by which movement is carried out. The author suggests the following structure of this teaching unit: 1. movement in a current and the droplet shape of a body and adaptation to movement; 2) cooperation between muscles and internal organs during movement; 3. control of human movement and the movement of robots - a cybernetical analysis; 4. pain in the movement system of an organism and its causes; 5. movement as a carrier of information. The author also provides information about a questionnaire administered to pupils which aimed at determining the incidence of diseases of the motor and skeletal system among pupils.

536. TROMMER, G. - TROMMER, G.:
Gegen Blattlausbefall: Schädlingsbekämpfung exemplarisch. Eine Unterrichtseinheit für die Orientierungsstufe
(Protection against Aphids (plant lice). Combating pests as a teaching topic for the lower classes of secondary school).
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 6, pp. 209-221. 3 worksheets, lit. 23.

Aphids can serve as an example for study within the framework of the topic about combating pests. The relation between combating pests and combating disease in man is stressed and these problems are connected with problems concerning the environment and its conservation and equilibrium. Pestacides, herbacides and insecticides are all excellent means of combating pests, but at the same time they are also dangerous to useful insects (honey bees), ants, etc. But also human health is threatened by these substances. The article deals with Aphids found on various plants, their relationship to ants and biological equilibrium between Aphids and the environment. Arguments for and against chemical means of combating Aphids are cited and a number of suitable assignments for independent work by pupils are given.

instruction + biology, zoology, plants + pests, plants + conservation, preparations for teaching - 147307.

537. WEMER, E.:
Wie sich Tiere in Gruppen vor Feinden schützen
(How animals in groups protect themselves against enemies)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 1, pp. 19-26. 6 worksheets.

Many animals do not live alone and protect themselves against predators by forming flocks, herds or other groups. Musk oxen form a barrier with their bodies against enemies; in the centre of the herd are old animals protecting young calves. Starlings form dense flocks when a bird of prey is approaching and by constantly changing the density of the flock they expose the predator to lethal danger. The Mistle-thrush protects itself against predators by spraying them with feces when they perch. Also beetles have various protective strategies. This article is a continuation of a similar article about the protective strategies of plants.

instruction + biology, zoology, ethology, preparing for teaching - 147307.

12.23 Preparations for instruction in human biology

538. BOLAY, E.:
Untersuchungen an Wurst als Beispiel einer Unterrichteinheit Ernährung (A study of sausage as a topic within the teaching unit Nutrition)
Der Biologieunterricht, 18, 1982, No. 1, pp. 63-78. Lit.18.

In view of the importance of the teaching unit Nutrition the author suggests a study of sausages as human food as a special teaching topic. In the theoretical part, the role of proteins in human food should be explained, the differences between plant and animal proteins, the increasing consumption of meat, the change man has undergone from an omnivore to a carnivore, the consequences of eating too many proteins of animal origin, various kinds of meat and their nutritional value and the production and nutritional value of various types of sausage. In the practical part of the lesson various tests can be done to determine the quality of sausages, the content of inorganic substances in them and a qualitative assessment of the organic substances found in them. Also an experiment can be done to determine how well sausage is digested. In the FRG the annual per capita consumption of meat is 91.6 kilograms.

instruction + human biology, nutrition + humans, proteins, preparations for teaching - 147307.

539. BRECKLER, J.L.:
The Competition Edge
The Science Teacher, 49, 1982, No. 9, pp. 28-32.
11 figs.

Some muscles in man contract very rapidly in the course of action, while others contract more slowly. Thus muscles can be divided into two groups: rapidly and slowly contracting ones. Rapidly contracting muscles in the majority of cases have an aerobic metabolism, where their rapid activity is the outcome of energy production by glycolysis with a relatively small consumption of oxygen. Slow working muscles are required in activities which require a large quantity of oxygen and its constantly supply. The author explains and shows diagrams about our existing knowledge in this area and cites the example of sprinters, hurdle runners and those who compete in the long and high jump. Students learn about the mechanism of muscle cells.

instruction + human biology, muscle system, preparations for teaching - 147307.

540. BRUNOVT, E.P. - RUMYANTSEVA, M.N.:
Metodicheskiye rekomendatsii k izucheniyu voprosov gigieni v temakh "Opornodvigatelnaya sistema" i "Krov"
(Methodological recommendations for teaching problems of hygiene in the topics "The supportive and motor system" and "Blood")
Biologiya v shkole, 56, 1982, No. 6, pp. 47-52.

The authors systematically analyse two lessons devoted to human anatomy and human hygiene. They describe not only the structure and functions of the supportive and motor systems, but also explain the importance of excercises and sports for strengthening health and normal development. A sendentary way of life (hypodynamics) often leads to the defective development of the supportive system. The structure and growth of bones depends on the amount of movement a person makes. Also the outline of another two lessons devoted to the prevention of infectious disease and principles of hygiene which should be maintained if a person is afflicted with an infectious disease are provided in conclusion.

instruction + human biology, muscle system, supportive system, preparations for teaching - 147307.

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541. BRUNOVT, E.P. - RUMAYNTSEVA, M.N.:
Ob organizatsii eksperimentalnogo prepodavaniya kursa "Gigienicheskoye i polovoe vospitanie uchashchikhsya" v 1982/83 godu (On organizing the experimental teaching of a course on "Hygiene and Sex Education of Pupils" in the school year 1982/83.)
Biologiya v shkole, 56, 1982, No. 5, pp. 42-47. 2 tabs.

The authors continue in the subject-matter discussed in an article published in this journal (Nos. 5 and 6, volume 55 (1981) and Nos. 1 and 3 in volume 56 (1982)). They analyse the experimental teaching of the course cited in the title of the article, which was taught in the 8th class in the school year 1981-1982. The authors recommend various literature for teachers concerning these problems. Also various advice is given to teachers on how to proceed in teaching this subject-matter. A table provides a survey of changes which have been introduced in these topics in the experimental course.

instruction + human biology, health-care education, education + hygiene, sex education, preparations for teaching - 147307.

542. CARSTENSEN, U. - PATZELT, E.:
Amazonas - Indianer (Welche Überiebensschansen haben diese Naturvölker des tropischen Regenwaldes)
(The Amazon Indians - What are the chances for survival of the primitive peoples of the tropical rain forest)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 1, pp. 12-18, 3 workshets, 1 information sheet, 5 photos.

The author provides interesting information about South American Indians and their present problems and poses the question of their chance for survival. The story of the Auka and the Ivaros tribes is typical for the region. These people carry on a hard struggle for survival in the tropical jungle but at the same time they are in conflict with the interests of oil drillers and with the army. Their civilisation is threatened. In this topic, interdisciplinary aspects are stressed - especially those of biology and geography. The Auka tribe has about 500 members who live on an area of about 5000 square kilometers. The author describes their way of life and other interesting facts: they have no musical instruments, no spinning instruments, no ships, no alcoholic beverages, they are semi-nomads, hunters and fishers; they also collect fruit and breed wild animals. For weapons they use blow darts with poison (curare). They also cultivate small fields with cassava crops. Their dwellings are very simple, they use hanging nets as beds. One to five families live in a single house.

instruction + human biology, Indians, tropical rain forest, preparations for teaching - 147307.

543. CASSUBE, M. - WINDELBAND, A.:
Vorschläge zur Forderung schöpferischer Lerntätigkeit in der Stoffeinheit "Stammesentwicklung des Menschen" in Klasse 10 (Suggestions for supporting creative learning activities within the framework of the teaching topic "The phylogeny of man" in the 10th class) Biologie in der Schule, 31, 1982, No. 1, pp. 6-10. 2 figs.

The authors analyse in detail various alternatives of teaching units conceived in a problem manner, which also includes the development of man from his animal ancestors and the development of human races. For each lesson the authors give its educational and teaching objectives, teaching media to be used, etc.

instruction + human biology, phylogeny + man, preparations for teaching - 147307.

544. CYMBOROWSKI, B.:

Biologiczne podstawy zachowania sie. (The biological foundations of behaviour)

Biologia w szkole, 35, 1982, No. 2, pp. 67-71. 4 figs.

Among the subjects of study in human behaviour are congenital instincts and instincts which are acquaired as a reaction to the environment of the organism. This problem can be approached in a psychological or biological manner. A psychological approach was predominant earlier and stress was explained by learning and mental processes, reason and volition. With Darwin, the psychological approach was abondoned in favour of biology and later ecology, bio-chemistry, neurophysiology and ethology. Also a new science, physiological psychology, studies the behaviour of animals. The author describes a number of interesting experiments which provide insights into animal behaviour: Rats bred in cages without material for the building of nests lose the nesting instinct and even when they subsequently receive material for nesting, they do not built them. A female rat which was prevented from washing itself when pregnant, did not wash her progeny. A decapitated male Praying mantis walked in circles and began to carry out copulation movement. Even after decapitation the insect is capable of copulation and the fertilization of a female mantis. It was shown that insects have a section of the brain which controls behaviour connected with the intake of food. When this area is destroyed, this leads to the insects overeating and to their subsequent death.

Ethological analyses have led to new findings concerning human behaviour: brain centres for thermal regulation and for the regulation of food intake have been found. A brain centre for satiation and one for hunger have been found in vertebrates. When a human has eaten, the level of glucose in the blood rises and this stimulates the area which creates a feeling of satiation so that no more food is eaten. A decline in the glucose level on the other hand stimulates the hunger area and the person begins to eat. In other words hunger and satiation are not reactions to the amount of food in the stomach. A cube of sugar will rapidly dampen a feeling of hunger, but only for a short time. This is not suitable before dinner - for this reason we do not begin dinner with a desert.

instruction + human biology, ethology, zoology, preparation for teaching - 147307.

545. DYLLA, K.:
Humanökologie - in der kritischen Einschätzung eines Leistungskurses 12.2 (Human ecology - a critical assessment of its place in the final biology course in the 12th class)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 2, pp. 39-45. Lit. 4, 1 tab., 1 teaching material.

The author provides information on a research project which he carried out with a small number of pupils, but which nevertheless brought very interesting and applicable findings. The project concerns the determination of fields of science and science problems in which pupils are interested. Pupils expressed their greatest interests in subjects which are connected with their personal interests and problems which are important from the point of view of the individual, as well as society. Some subjects are not, however, popular, because they are not within the pupils' field of vision. They assessed positively such topics which help them in forming their own opinions concerning open and frequently discussed problems. Problems in the natural sciences which have ethical implications are the subject of the greatest interest. Greater interest was found to exist in topics and subjects which are of immediate interest, while problems important from the point of view of chosing a future occupation are considered to be less important. An example concerning the biocoenoses found in the praire was used in the project.

instruction + human biology, ecology, preparations for teaching - 147307.

546. FUDATA, S.:
Pierwsza pomoc (First aid)
Biologia w szkole, 35, 1982, No. 2, pp. 100-103, 1 fig.

In this outline of a teaching lesson for the 8th class of basic school the author deals with the problems of providing first aid when a person is wounded, faints or when a haemorrhage occurs. In fact the subject-matter dealt with concerns the blood circulation system in the human body. The didactical aim of the lesson is to provide pupils with knowledge and practical skills required to provide first aid in the case of extensive bleeding and haemorrhage. The author also describes in detail a didactical game for groups of 4 to 6 pupils. Various objects found in first aid kits serve as teaching aids. Pupils learn how to deal with skin wounds, deeper wounds, bleeding from the vein, from the artery, with an unconscious person. A game in which participants throw dice and move figures on a board requires of them to describe first aid procedures when they arrive at a field with a specific accident. They recieve points for correct answers.

instruction + human biology, health care education, didactical game, preparations for teaching - 147307.

547. GANEV, Z.:
Efektivnost na uchebnoto sdrzhanie po biologiya v VIII. klas (The effectiveness of the teaching syllabus for the 8th class)
Biologiya i khimiya, 25, 1982, No. 3, pp. 25-32.

In the biology course taught in the 8th class among the topics taught are human anatomy, physiology and hygiene. It is assumed that a development approach will be used and that pupils will recall the knowledge they gained in the study of botany, zoology, phylogeny and the relation between man and other organisms. Within the course, general knowledge in biology concerning the transformation of matter and energy in the cell, in an organ and a whole organism are dealt with. The course is comprehensive and integrates knowledge from various biological disciplines including anatomy, physiology, histology, cytology, embryology, ecology, as well as personal and general hygiene. Health care aspects and the aspect of providing first aid are stressed. The author discusses the textbook which is used to teach this subject-matter. While assessing in a positive manner the logical structure of the textbook, he stresses the possibility of its use for pupils' independent work. The methodological handbook which accompanies this textbook and teaching syllabus stresses specific methods of teaching and provides a number of alternatives according to the local

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conditions of the school. But as far as the teaching media and aids used for teaching this subject-matter is concerned, the author stresses grave shortcomings. Most schools have only obsolete microscopes, they do not have a sufficient number of anatomical atlases for pupils' independent work, and there are too few suitable films which would show pupils some important physiological processes which take place in the body. Verifications of children's knowledge in this subject-matter indicate that the shortage and poor quality of teaching media and aids are proving to be a serious shortcoming and their improvement is a prerequisite for increasing the effectiveness of biology instruction in the 8th class.

instruction + human biology, textbook, methodological handbook, instruction media, preparations for teaching, Bulgaria - 147307.

548. GÖRZ, G.:
Muskeln und innere Organe arbeiten zusammen (Muscles and internal organs cooperate)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 11, pp. 368-396. Lit. 9, 6 figs., 11 tabs., 3 worksheets.

Movement cannot be reduced to the mere contraction of muscle fibres because a number of internal organs also participate in this process, including the supportive system, the nervous system, respiration and the circulation system. A muscle in action must be controled by nerves, it must be provided with nutrition, it must be able to gain energy which it then tranforms into work. The author suggest teaching a thematic unit composed of three sub-topics: 1. the muscle as an organ to transform energy (1 or 2 teaching lessons); 2. Muscle movement requires the input of fuel and the removal of waste created in the metabolism process and water (1 to 2 teaching lessons); 3. The movement of muscles requires the cooperation of a number of organs (1 - 2 teaching lessons).

instruction + human biology, physiology, muscle system - 147307.

549. HADDOW, P.K.:
Human Genetics Education in the High School: A Pilot Program
The American Biology Teacher, 44, 1982, No. 2, pp. 94-97.

High school students do not gain sufficient knowledge in human genetics and teachers are not sufficiently informed about this important aspect of human development. The author suggests organizing a two-day seminar for teachers and the students of upper classes where various aspects of human genetics could be described and the laboratory techniques which this science uses, as well as the foundations of cytogenetics, pre-natal diagnostics, the future of genetics, genetic therapy, test tube fertilization, genetic counselling and the ethical problems connected with genetics. He recommends that papers at these seminars organised by high schools, be presented by specialists from colleges and universities.

instruction + human biology, genetics, preparations for teaching, seminar - 147307.

550. HERRMANN, J.:
Diskussion und Fakten um die Herausbildung des Menschen und der menschlichen Gesellschaft (A discussion of the facts concerning the development of man and human society) Biologie in der Schule, 31, 1982, No. 12, pp. 497-505. 1 tab.

The author points to the non-scientific nature of some bourgeois biological concepts which attempt to reject the decisive role of labour in the phylogeny of man. On the basis of Engels' book "The Contribution of Labour towards the Humanizing of the Ape" the author deals with various attempts to reject the role of labour in the phylogeny of man. He criticizes the opinions of K. Lorenz concerning the so-called aggression instinct, as well as the opinions of J.M. Smith, R. Dawkins and others which are modern alternatives of social Darwinism. A. Ardrey who considers hunting and the territorial behaviour of Australopithecus as a manifestation is also critized. of the aggression instinct. The author goes ont. discuss various genetic aspects in the phylogeny of man, for instance the pairing of isolated human DNA chains with those originating in anthropoides, as well as the development and importance of various modifications. The author goes on to positively explain the role of labour in the humanization of man as the main force of phylogeny. The work of G. Heberer and Kochetova are cited. In conclusion the author explains the main stages of human phylogeny, and the role of labour in this process. He stresses the close connection between the work process (which is defined) and anthropogenesis, as well as various stages of labour and the development of this process itself. A preliminary stage was the use of natural or only slightly adjusted instruments (about 10 million years ago)by early hominids. The first stage of labour began about 4 million years ago with Australopithecus (the making of tools according to models and mental pictures, abandoning them after use). The second stage of labour was characterized by the gradual development of the labour process (the objective of work processes are thought out in advance, before beginning work) and was typical for Homo erectus and Homo sapiens; at the same time the prerequisites for the development of social relations appeared.

instruction + biology, human biology, phylogeny, work + man - 147307.

551. KHRIPKOVA, A.G. - KOLESOV, D.V.:
Materialy k temam "Lichnaya gigiena devochki i malchika" i "Nravstvenniye osnovy vzaimootnosheniy malchikov i devochek" (Material concerning the topic "Personal hygiene of boys and girls" and "Moral principles of mutual relations between boys and girls)
Biologiya v shkole, 56, 1982, No. 3, pp. 49-58.

Here the authors deal with instruction concerning the teaching of the two topics cited in the title, which touch on problems concerning anatomy, physiology and hygiene. They also discuss how to explain to pupils the principles of hygiene in relation to the sexual maturity of boys and girls. In conclusion attention is devoted to human reproduction and to the moral aspects of relations between men and women.

instruction + human biology, hygiene, sex relations, preparations for teaching - 147307.

552. JOHNSON, V.R.:
Myelin and Maturation: a Fresh Look at Piaget
The Science Teacher, 49, 1982, No. 3, pp. 41-49. 3 figs., 3 tabs.

The development of cognizance is individual in each person; nevertheless Piaget discerns four periods of this development. Individual periods have in common the development of mental activity; the author describes the complex development of the brain from the point of view of Piaget's 4 stages of development (before reaching 2 years, between 2 and 7, between 7 and 11 and from 11 to adulthood). She describes in detail the development of these stages and the development of the brain and its mental functions, the specialization of the cerebral hemispheres and the role of school in the education of pupils.

instruction + human biology, psychology, central nerveous system, brain, hemisphere + brain, preparations for teaching - 147307.

553. KLEINERT, R.:
Didaktische und methodische Vorbemerkungen zum Thema Stress (Didactical and methodological preliminary comments on the topic "Stress")
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 2, pp. 33-41, 2 figs.

The rapid cultural development of some countries has led to a discrepancy between the phylogenetically old and only slowly changing patterns of reactions and behaviour and the rapidly changing human environment. Essentially, this is the cause of genetic stress which in turn leads to the existing exaggerated ability to explore. In everyday life constant clashes occur between both aspects, when obsolete mechanisms of adaptation are confronted with modern situations. Stress is a non-specific stereotype and a phylogenetically old pattern of response by which an otherwise primary organism prepares itself for physical activity. But in a modern environment it often happens that an otherwise life-saving reaction leads to pathological consequences. Especially in an urban setting, stress makes a great impact. Everyone lives with this stress, which can lead to neurosis and extensive excitation. The author discusses the reason for including the topic of stress into the biology course; it forms an important component of health care education. Especially pubescent pupils may have problems with stress. In school it can be caused by changes in the teaching staff, changes in classes, insufficient sound isolation, a bad location of the school, by a lack of space and too small classrooms, by classes which are too heterogenous, by optical excitation, etc. Stress situations tend to grow on the basis of the rule that the resulting effect of excitations is larger than their mere sum and can then lead to unbearable situations. In recent years the number of psycho-somatic diseases has greatly increased and so-called civilisational diseases have appeared. Stress in itself deserves an interdisciplinary approach (biology, medicine, psychology, sociology). A stress situation is in fact a situation where the body adapts to loading of various types. It can increase readiness for action and the ability of the body to resist, but stress may also take the form of a blockade, where the pulse rate accelerates, the blood vessels are stricken, blood pressure goes down, digestive and sexual functions are surpressed, reserve energy sources are mobilized, etc. These are all important biological responses needed to

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survive in a dangerous situation, especially in a situation when man was a hunter and collector of herbs and fruits. These reactions are entirely inadequate for contemporary situations. If an automobile accident occurs, this is not a situation to run away from or attack. Stress situations occur in three long-term stages: alarm, resistence and exhaustion. A positive form of stress is called eustress, and its negative form distress. Factors which cause stress are called stressors. Manifestations of stress are called a stress syndrome. When a person lives with permanent stress syndrome then acute disorders and disease occur. Two types of people can be distinguished in relation to stress: Those with increased excitation of the sympathetic nerves (sympathicotonia) and those with increased excitation of the vagal nerve (vagotonia). The influence of stress on the central nervous system and the effect of hormones on a stress situation are also discussed. This teaching unit is divided into 9 basic sub-topics for 14 teaching lessons, which can be taught in the 10th class of general education secondary schools. Also descriptions of experiments which can be done are provided as well as drafts of worksheets.

instruction + human biology, preparations for teaching, stress - 147307.

554. KRUPKA, L.R. - VENER, A.M.:
Treatment of Aging in Secondary School Biology Textbooks: a Neglected Phenomenon
The American Biology Teacher, 44, 1982, No. 5, pp. 264-269.
3 figs., 2 tabs.

Aging is part of biological development in all forms of life; it is manifest in a loss of energy and loss of resistence towards disease. Older people suffer more frequently from chronic disease then the general population and require about 25 % more drugs. The authors have surveyed 43 different biology textbooks for the upper classes of high school and have found that 84 % of them do not deal with the phenomenon of aging at all and the remainder only in a very limited way. They suggest that a discussion of the process of aging is included into the final part of the biology course. They also provide a table which sums up the physical and physiological aspects of aging and enumerate how individual organs in the human body react to aging. A note on the aging of the fruit fly (Drosophila melanogaster) is very interesting: aging is indicated by the duration of flight of the insect and the number of times it waves its wings in flight.

instruction + human biology, aging + man, preparations for teaching - 147307.

555. LETHMATE, J.:

Zur Steuerung des weiblichen Sexualverhalten bei Primaten. Ergänzungen zum Beitrag Günther K.H. Zupanc "Zur Plastizität des Sexualverhaltens bei Primaten und beim Menschen" (Concerning control of feminine sexual behaviour in primates. Comments on a paper by Günther K.H. Zupanc "Concerning the plasticity of sexual behaviour in primates and man")

Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 6, pp. 183-189. Lit. 17, 1 tab., 4 figs.

The author provides information on experimental studies of the higher primates (not anthropoids) which concerned the sexual behaviour of females. The sexual behaviour of the females of these animals depends on hormones. Androgenes play the role of libido hormones and are decisive both in males and females in the studies described. The behaviour of female Rhesus monkeys was studied and the intensity of their sexual drive in the course of one menstruation cycle. The analysis concentrated on the ability (preparedness) to copulate, on receptivity (the reaction of the female to copulation attempts by the male),the demand for copulation and attractivity (behaviour on the part of the female which activates copulation attempts by the male). In castrated females of the Rhesus monkey receptivity declines or disappears, but after the administration of androgens it again increases. Atractivity declines or disappears only when androgens are completly lacking. Astrogens influence attractivity by changing vaginal secretion in which special pheromones develop, so-called copulines (mixtures of different fatty acids), which influence the number of sexual gestures made to provoke sexual intercourse; in other words receptivity is increased by the presence of androgens. Oestrogens influence attractivity, while androgens influence the libido. Copuline has also been found in the vaginal secretion of women. Women also use perfumes as attractors. Women are capable of satisfying a man for the majority of the ovulation cycle and are sexually excitable for this whole period. Orgasm is much more widerspread in humans then in monkeys. But among humans there are marked differences in this respect between various individuals. In some communities female orgasms are normal and frequent, while in others unknown. Older, experienced women have orgasms more frequently than young and inexperienced women. The adrenals are 70 % larger in women than in the females of the chimpanzee.

instruction + zoology, human biology, sex - 147307.

556. LOOS, W.:
"... und sie reden mit Händen und Füssen". Bewegungen als Informationsträger (" ... and they spoke with their hands and their feet." Movement as a carrier of information)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 11, pp. 417-423. Lit. 4, 3 worksheets, 3 figs.

Problems connected with non-verbal communication are the subject of two teaching lessons described and recommended by the author in this article. Human movement does not serve only for moving from place to place, but frequently it is also the carrier of information and a means of communication. This can be demonstrated by organizing observations by pupils. It is interesting to study which of these movements are congenital and which are acquired. Regional differences exist in non-verbal communication. Pictures and worksheets provide opportunities for carrying out simplified studies of non-verbal communication. It is, however, difficult to clearly interpret findings. Regional differences are very interesting to study. Throughout the world when children have a tantrum they stamp their feet, stick out their tongues, etc. Winking is an international greeting.

instruction + human biology, non-verbal communication, preparation for teaching - 147307.

557. MOSSNER, H.:
Die Bewegungssteuerung bei Mensch und Roboter - eine kybernetische Analyse (Movement control in man and in robots - a cybernetical analysis)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 11, pp. 397-406. Lit. 20, 2 worksheets, 9 figs.

First the author analyses the opening move in a chess game as it is played by a person and a robot;

then he analyses the movement of the hand by a person and a machine, on the basis of cybernetics. This input and output analysis leads to the draft of a structural model. Movement in a biological system is controlled by its sub-systems (sensory organs, central nervous system, the muscles of the hand), while in an abiotic system (a robot) these sub-systems are imitated. In class, this subject-matter can be divided into two sub-topics: 1. control of movement in a man and a robot in an open chess game (3 teaching lessons), 2. movement as a controlled process (1 teaching lesson). The author recommends including this topic into class work in the 9th or 10th class in the context of the topic Human movement - the motor and supportive systems. Cybernetics helps to deal with various functional relations between a biotic and abiotic system.

instruction + human biology, muscle, motor system + man, robot, preparations for teaching - 147307.

558. PENNY, J.A.:

Burnout

The Science Teacher, 49, 1982, No. 7, pp. 47-49.

Stress is now encountered very frequently. Anybody can find himself in a stress situation, including students, physicians, workers and housewives. Stress is a passive or negative reaction which occurs when disequilibrium develops between the demands made by the environment and the ability of the individual to deal with them. The author explains stress, how it develops, its physical and physiological symptoms and human behaviour in a stress situation. He also provides instruction on how to avoid stress. The first rule for this that a person under stress should not be isolated from his collegues or friends. The article is highly instructive for biology teachers and useful for human biology instruction.

instruction + human biology, stress, preparations for teaching - 147307.

559. PIOTROWICZ, M.:
Jak realizować w kladie IV dział programu "Romnazanie i rozwój człowieka" (How to implement the teaching syllabus for the 4th class in the topic "The reproduction and development of man")
Biologia w szkole, 35, 1982, No. 2, pp. 104-107. Lit. 3.

The author discusses how and when to begin the sex education of pupils. He points out the positive and negative arguments for introducing sex education in different classes for various age groups. In the author's opinion basic information concerning the structure and function of sex organs in humans should be provided already in the 4th class of basic school. A committee for the 4th class curriculum discussed the reasons why this subject-matter should be included at so early a stage; the main reasons cited were the acceleration of development in young people who now become mature earlier and the life of society (films, television, the radio, literature, the press). It is better to provide serious information by schools early than allow children to acquire random information from peers or older children. Psychologists and educators support placing this subject-matter into the 4th class curriculum, where the information is accepted with less excitment and more understanding than later. Not all parents are able to provide this information to their children. The author considers it better to provide this information too early rather than allow children to acquire incorrect information or information that is provided too late. The advantage of the biology textbook is that information concerning sexual organs is presented in the same way as information concerning other body organs, it is easily comprehensible and forms basic notions. Information on human reproduction carries on the same information concerning animals. The textbook also refers children to their parents as far as questions and problems are concerned. The illustrations in the textbook suitably accompany the text. Teachers should contact parents before beginning with sex education and advise them on how to continue in the education begun by school. The teacher should also recommend the appropriate literature to parents.

instruction + human biology, sex education, preparations for teaching - 147307.

560. RASZEJA, S. - SZEZERKOWSKA, Z.:
Grupy krwi u lidzi (Blood groups in humans)
Biologia w szkole, 35, 1982, No. 4, pp. 246-249.
1 fig., 1 tab.

The article describes the history of the discovery of blood groups in humans; the names of the Viennese physician Landsteiner and the Polish physician Karol Hirsfeld are cited. The author explains blood groups and blood transfusions, and provides a table of blood groups A, B, AB and O in progeny. Also the Rh factors is described and the characteristics of antigens (Haptoglobulin, transferin, alpha-2-globulin, immuniglobulin, beta-lipoprotein, etc.) are given. The enzymatic components of red blood cells are explained (phosphatase and a number of others). In Poland the polulation has the following blood groups: 40 % have A, 30 % have O, 20 % have B and 10 % have AB.

instruction + human biology, blood groups, preparations for instruction - 147307.

561 SEREMAK, M.:
Metoda panelowa (The panel method)
Biologia w szkole, 34, 1982, No. 2, p. 102-103. Lit. 5.

The author discusses the teaching topic "Breathing clean air". The teaching syllabus assumes the teaching of the following problems: the structure and function of the respiratory system in humans, the negative effects of tobacco smoking, the importance of clean air, the ventilation of rooms, the importance of greenery. The educational aim in this topic is to lead pupils towards the independent acquisition of information by pupils especially concerning the negative effects of tobacco smoking, the need for proper ventilation and the need for greenery. A panel discussion can be organized, as well as showing films and the use of various teaching media. Among the topics which can be discussed at a panel discussion are the following: determining the composition of tobacco smoke (nicotine, tar), the effect of these substances on the respiratory tract, a physician can give his opinion on the effects of smoking, a former smoker who is ill can speak about smoking, statistical data concerning the number of smokers and the number of cigarettes per smoker can be cited, etc. A summary of the panel discussion can then be used in class.

instruction + human biology, respiratory system, smoking, anti-smoking education, preparations for teaching - 147307.

562. SCHULER, F.:
Schāden an unseren Bewegungssystem (Damage to our motor system)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 11, pp. 406-417. 1 fig., 8 worksheets

A person's motor system is subject to various types of damage. The author enumerates this damage on the basis of a description of the functioning of the system. Since a great deal of damage can be done already at an early age and the consequences of this damage then last a lifetime, prevention is very important. Faulty posture is found in 25 % of all 13 to 14 year old children. Of this number 35 % suffer from damage to the motor system while almost 50 % of pupils have feet and/or leg deformations. This subject-matter can be divided into several sub-topics: 1. Why does your back ache ? (1-2 lessons); 2. Must I carry heavy burdens ? ; 3. What to do when a bone is broken ?; 4. What to do when a shoulder or knee joint is wounded ? (1-2 lessons); 5. What are the causes of pain in muscles (1 lesson). Also scoliosis, hunchback, flat feet, muscle ruptures, muscle cramps and others are explained.

instruction + human biology, muscle system, prevention, hygiene, preparation for teaching - 147307.

563. SINGLETON, R.J. - BROCK, D.H.:
Teaching Bioethics from an Interdisciplinary Perspective
The American Biology Teacher, 44, 1982, No. 5, pp. 280--285, and 313. 2 tabs.

Bioethics is a new science which deals with the social aspects of biological processes - phenomena which are closely associated with the present moral attitudes of society. These phenomena include abortions, experiments on humans, mental disease, genetic malformations, etc. The authors attempt to reflect the scope and nature of these problems from the point of view of philosophy, history and literature. They cite for instance the well known story by Leo Tolstoy called "The Death of Ivan Ilich", where Tolstoy analyses how people react to dying and death. In conclusion the authors provide the outline of a week-long course in bioethics and a bibliography on this subject-matter.

instruction + human biology, bioethics, moral education - 147307.

564. STLOUKAL, M. - HOMOLA, J.:
Antropogeneze ve IV. ročníku gymnázia (Anthropogenesis in the 4th class of general education secondary school) Přírodní vědy ve škole, 33m 1981-1982, No. 1, pp. 5-7. Lit. 6.

The authors deal with the problem of anthropogenesis from the point of view of contemporary science, since the textbook on human biology used in general education secondary schools does not properly reflect contemporary opinions and findings. They concentrate on the process of "hominization" and "sapientization", and discuss the position of the classical Neanderthal man in the line of evolution of modern man and differentiate between Neanderthal man, Ante-neanderthal man (Homo sapiens steinheimensis) and early Neanderthal man etc. The latter is now considered to be a dead end in evolution. The intermediate link in the evolution of contemporary man is not Neanderthal man but rather Homo sapiens palestinus. The article also develops a timetable which indicates the ages to which individual paleonthological findings from the Tertiary era are related, the development of hominids and Homo sapiens.

The article also contains an outline of the family tree of man, a reconstruction of skulls of man's ancestors, as well as questions and assignments to give to pupils concerning this subject-matter.

instruction + human biology, phylogeny + humans, preparations for teaching - 147307.

565. VERBEEK, B.:
Angeborenes Verstehen und Missverstehen. Ein Beitrag zum anschaulichen Ethologieunterricht (Inborn understanding and misunderstanding. A contribution to the ostensive teaching of ethology)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 6, pp. 201-208. 1 fig., 1 transparency in 10 alternatives.

The author provides the outline of a class project to compare a human baby with young animals: kittens, piglets, little elephants, ducklings, bear cubs and also with an old man, a raindeer, camel and buffalo. The basic outline of a young animal has a protruding forehead and large eyes. Instinctive care for the young is inborn both in humans and in animals. Films, advertisments and the toy industry all make use of this fact for their own objectives. The transparencies provided by the article allow pupils to combine individual parts of a young animal. For instance the head of a camel does not make a childish effect and is similar to the head of an old man, while the outline of a buffalo, with its protruding forehead, makes a young impression. Pupils assess the combinations of pictures they create.

instruction + human biology, ethology, preparations for teaching - 147307.

566. ZAJKOWSKA, H.:
Czynności i budowa ukladu wydalniczego (The function and structure of the excretion organs)
Biologia w szkole, 35, 1982, No. 1, pp. 48-50. 2 figs.

The teaching syllabus includes the topic "The structure and function of the excretion organs" which include the kidneys, urinal ducts, urinal bladder and the hygiene of the excretion system. The didactical aim of teaching this topic is that pupils acquire correct knowledge, as well as correct hygienic habits. A problem approach should be used and the textbook used extensively. The lesson dealing with this topic is described, as well as a didactical test with multiple choice answers.

instruction + human biology, excretion organs + man, preparations for teaching - 147307.

12.24 Preparations for instruction in general biology, genetics and molecular biology

567. ALEKSANDROVA, Y.:
Obshchestvyavane na politekhnicheskiya printsip v obuchenieto po biologiya (The implementation of the polytechnical principle in biology teaching)
Biologiya i khimiya, 25, 1982, No. 5, pp. 34-39. 2 tabs.

In a developed socialist society with the aim of technical, scientific and social progress, it is important to gain knowledge of the laws and principles of the natural, technical and social sciences, which in turn form the foundations of industrial production. In biology this purpose is served by acquainting pupils with the

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laws of biology, which are relevant to the use of a microscope and for the utilisation of plants and animals in industrial production. The author considers the implementation of the polytechnical principle in the 10th class to require above all better explanations of the subject-matter related to industrial processes, as well as agriculture, without changing the logical structure of the syllabus. These include biosynthesis, the reproduction of organisms, nutrition, growth and development, the selection and breeding of plants and animals, etc..

instruction + biology, polytechnical education, preparations for teaching - 147307.

568. BARTOWIAK, E.:
Mitosa i mejoza (Mitosis and meiosis)
Biologia w szkole, 35, 1982, No. 3, pp. 149-154. 7 figs. 1 tab.

The author compares mitosis and meiosis. Mitosis concerns somatic cells where each "maternal" cell divides into two "daughter" cells, each of which has the same number of chromosomes as the "maternal" cell and both new cells have the same genetic composition. Meiosis concerns only sexual cells, where each "maternal" cell produces four sexual cells and the number of chromosomes in the "daughter" cells is reduced to half; each new cells has a different genetic composition, depending on the division or combination of genes.

instruction + general biology, genetics, division + cell - 147307.

569. BRETSCHNEIDER, J. : GLÄSER, H.:
Natürliche Auslesespielerisch simuliert (Natural selection - its simulation in a game)
Biologie in der Schule, 31, 1982, No. 4, pp. 157-160.
2 tabs.

A number of difficulties arise in teaching evolution theory, which make it difficult to understand the laws which govern this process, for instance the time factor, and the impossibility of experimental verification. A model experiment suggested by the author provides an opportunity to overcome some of these difficulties. Stripes of paper in 10 different colours, 25 large and 25 small strips for each colour are needed, as well as a piece of fabric or wallpaper at least 1 meter x 1 meter with a colourful pattern and transparent bowls for keeping the paper strips. The idea of the experiment is that in a specific environment represented by the fabric or wallpater, a number of variously coloured individuals live in a single population (the strips of paper). These individuals are the prey of predators, represented by the players. The paper strips represent various phenotypes. The predators destroy 75 % of the population before they can have progeny. The surviving part of the population then reproduces and increases the population again to its original size (for the sake of simplicity we assume non-sexual reproduction), The destruction and revival of a population is repeated several times, so that the surviving organisms are well masked, their colour makes it difficult to distinguish them on the background of the colourful pattern. In this way the population has "adapted" to its environment. The authors provide detailed information on how to organise the game and its rules for players and describe their own experiences with playing this game in class.

instruction + general biology, natural selection, Darwinism, preparations for teaching, didactical game - 147307.

570. BROVKINA, E.T. - REZNIKOVA, V.E.:
Rekomendatsii po izucheniyu temi "Razvitie zhivotnogo mira" (Recommendations for teaching the topic "The evolution of the animal kingdom")
Biologiya v shkole, 65, 1982, No. 2,pp. 26-32.

In the 7th class biology course the content of the topic The evolution of animals has changed in connection with the transfere of this topic to the final part of the course. This topic is very important from the point of view of education towards a scientific worldview and for developing pupils' abilities to think, for developing a comparative approach to animals, etc. All this aims at developing in pupils a materialistic worlview of the natural world. The topic is divided into 4 teaching lessons, which include the following problems: proof of the historical development of animals, the theories of Charles Darwin, heredity and variability in animals, the struggle for survival, natural selection, the basic stages of evolution of vertebrates. The authors describe each teaching lesson in detail.

instruction + general biology, Darwinism, phylogeny + animals preparation for teaching - 147307.

571. BRUMBY, M.N.:
Students´ Perceptions of the Concept of Life
Science Education, 66, 1982, No. 4, pp. 614-622. 1 fig.
5 tabs.

So far no precise and acurate definition of "life" has been provided. The traditional seven characteristics of a living organism include growth, reproduction, external respiration, nutrition, excretion, excitation and movement. However, the author does not consider these criteria as being fundamental. The main problems in this area which the author discusses are: How do secondary school students describe life ? What criteria do they use to distinguish "living", "dead" and "non-living"? Does their concept of "life" include the essential relationship between an organism and the biosphere ? The author studied the responses of 45 students to these and similar questions; she describes her findings and the students´ responses. She also describes the methodology she used in the study.

instruction + general biology, forming of notion, life - 147307.

572. CASSUBE, M. - WINDELBAND, A.:
Vorschläge zur Förderung schöpferischer Lerntätigkeit in der Stoffeinheit "Aus der Geschichte der Abstammungslehre" Klasse 10 (Suggestions for supporting creative learning activities in the topic "From the history of phylogeny")
Biologie in der Schule, 31, 1982, No. 4, pp. 137-141.
2 figs.

The authors analyse 4 teaching lessons. For each the didactical objective of the lesson is cited, the teaching media recommended, the educational and teaching opportunities provided by the subject-matter and the formulation of problem situations which make use of radio programs.

instruction + general biology, phylogeny, history, radio + program, preparations for teaching - 147307.

573. DEMYANKOV, E.N.:
Zadachi k teme "Genetika i evolyutrionaya teoriya"
(Assignments for the topic "Genetics and evolution theory")
Biologiya v shkole, 56, 1982, No. 1, pp. 45-46.

The author cites 6 examples concerning the subject-matter of genetics and phylogeny which the teacher can use in class. All examples concern the genetics of populations and they are related to practical problems. The article contains not only a formulation of the assignment, but also an outline of the correct answer.

instruction + general biology, genetics, evolution theory, preparation for teaching - 147307.

574. DIXON, R.:
Take Two People - A Genetics Teaching Kit
Journal of Biological Education, 16, 1982, No. 4, pp. 229-230. 1 fig., 1 tab.

Genetics is a difficult subject even for talented students and much more so for those less capable of complex thinking. The author describes a simple method for introducing such students to genetics. In this graphic, visual method the characters of two parents are summed up on the black board (for instance the colour of their eyes, etc.). Genes are represented by pieces of cardboard which can be moved around, thus representing genetic processes. In spite of the simplicity of the method it serves very well to show very complex processes and in the author's experience is highly effective.

instruction + general biology, genetics, didactical game, preparations for teaching, simulation method - 147307.

575. DYRDA, J.F.:
Roswiasywanie sadań z genetiky (Solving problems in genetics)
Biologia w szkole, 35, 1982, No.3, pp. 179-180.

Solving problems in genetics requires logical thinking and analysis on the part of pupils, and requires that they also learn to use genetic symbols and terms. Before pupils begin with solving the problems the author recommends a discussion to be held to recall all the knowledge needed in solving the problems; it should include such questions as what are chromosomes, what are homological chromosomes, what are gamets and zygote, what is a gene, an allelic gene, a genotype and a phenotype, which genetic characteristics become dominant and which regressive, what symbols are used to designate dominant and regressive characteristics, what are homozygots and heterozygots, what is the law of gamet purity (so-called Mandel's law), how are characters divided in the F_2 generation. As an example, the article includes the solution of a genetic problem concerning the colour of flowers and the prickiness of the seed capsule of the Henbane, where white colour and a smooth capsule are recessive characters. The outcome of crossbreeding this plant is analysed.

instruction + general biology, genetics, law + heredity, preparation for teaching - 147307.

576. FLANNERY, M.C.:
Biology Today - Filling in the Picture
The American Biology Teacher, 44, 1982, No. 9,
pp. 552-554.

The article deals in detail with the effect of Desoxyribonucleic acid which in the fertilized egg is the carrier of information required to develop all parts of the body of the new individual. The problem of how linear DNA can contain such extensive series of three-dimensional information is discussed at length. The main problem to discuss with students, in the author's opinion, is how the cell knows which genes it should transcribe. The larger part of the article is devoted to a discussion of this problem. The solution of this problem is not yet scientifically complete and the author sums up what is known about the problem in an understandable manner, for the non-specialist.

instruction + general biology, molecular biology, DNA, preparation for teaching - 147307.

577. GAJEWSKI, W.:
Ewolucja pojecia genu (The evolution of the notion of a gene)
Biologia w szkole, 35, 1982, No. 3, pp. 131-137. 1 fig.

The notions created by science continue to undergo changes as the science itself develops. A classical example of such developments are the changes which have occured in the notion of a gene, which are closely connected with the development of genetics as a science. Before Mendel, only practical breeders of animals and crop plants considered heredity. Gregory Mendel for the

first time identified the factors of heredity. But the term gene was introduced for the first time by K. Johansen in 1909. All cells have a diploid number of chromosomes and gamtes a haploid number. For 10 or 15 years the term gene was used in Johanson's understanding and this notion is still sufficient for practical breeders. However, the question arose about where genes are localized, what is their physical substance, how they function and how they influence heredity. The answers to these questions were provided in 1915 by Thomas Morgan and his collaborators, who found that genes form linear patterns in chromosomes and that they have their stable position. They also discovered recombinations and crossing-over, which occurs between homological chromosomes. In 1953 J.D. Watson and F.H.C. Crick discovered a model of the double helix of DNA. Now the term gene was used to designate a segment of DNA of various quantity and various sequence of nucleotids. Thus genes give cells the ability to synthesize a specific structure and enzymatic protein, which influences the metabolism of the cell and the heredity of the organism. In the sixties the principles of the genetic code have become stabilised, as well as the sequence of nucleotids. The gene codes the sequence of aminoacids in polypeptides. In this context a gene has now come to mean a section of DNA which codes a specific protein; in other words one gene creates one protein or one polypeptid. Also two mutations in two different chromosomes have been discovered: trans and cis.
S. Benzer in 1957 discovered a nucleotid triplet, a so-called codon. A whole new field of genetics, called genetic engineering has developed, which either multiplies or isolates (clones) DNS genes of higher organisms

and carries out the sequencing of DNA. Exons and introns as composite genes have been discovered. Exons code the sequence of genes while introns represent a non-coded gene sequence. G. Khoran chemically synthesized a whole gene of Escherichia coli. It has been found that in some bacteria, viruses and plants or animals, DNA can be replaced by RNA. Thus the development of the gene within the framework of genetics has been of fundamental importance, in spite of the fact that when the term was first introduced almost nothing was known about its actual substance. The evolution of the term gene is a good example of the fact that in the advance of science what are at first abstract terms are decisive, because it is they which stimulate further research. The whole development of genetics can be seen as an endeavour to make the term gene more precise and specific, to provide it with substance. This process is not yet complete, but even if the present notion of a gene proves to be impractical, this would serve as an impuls for the further development of knowledge on this subject.

instruction + general biology, genetics, history, gene, preparations for teaching - 147307

582. GANEV, Z. - KOSTOVA, Z.:
Darvinizm i obucheniete po biologiya u nas (Darwinism and biology teaching in Bulgaria)
Biologiya i khimiya, 25, 1982, No. 4, pp. 27-32.

In spite of some delay, cause by the Turkish occupation, the ideas of Charles Darwin became known in Bulgaria already in the 19th century. Two different schools of thought developed, those who agreed with C. Darwin and those who did not. Representatives of social progress, such as Christo Botev and Lyuben Karamelov were among his followers. Polemical articles appeared in the press until the beginning of the 20th century when Darwinism finally became generally accepted in Bulgaria. Bulgarian communists have always connected Darwin's theories which those of K. Marx, but they did not accept Darwinism uncritically, they especially did not agree with Darwin's theory of the evolution of man, which did not take into account the social aspects of this development. The ideas of Darwinism penetrated Bulgarian schools slowly, at first only in botany and later zoology, then in geology and only finally in general biology. The following topics were included into the secondary school biology syllabus: biology before Darwin, the theory of catastrophes and Darwin's predecessors, Darwin and his theory, artificial and natural selection, the determination of characteristic signs in transitory forms, proof of the theory of evolution. By 1922 the theory of evolution was in the teaching syllabus for the 7th and 8th classes of general education secondary schools. Since 1945 Darwin receives full coverage in the teaching syllabus and besides the above cited problems also problems concerning genetics, heredity and variability, the role of selection, etc. Since 1964 stress is also placed on the phylogeny of plants and animals. In 1981-1982 a new teaching syllabus was introduced into the 9th and 10th classes which provided an integrated approach to Darwinism and its analysis of the organism as the outcome of diverse natural forces. Now Darwinism serves teachers as the most important methodological medium for the clarification of biological phenomena.

instruction + general biology, Darwinism, history + teaching, teaching syllabus, Bulgaria - 147307.

579. GEMEINHARDT, D. - WALTER, J.:
Von Fisch zum Landwirbeltier Höherentwicklung dialiktisch-materialistisch erklärt (From fish to terrestrial vertebrates - evolution explained from the point of view of dialectical materialism)
Biologie in der Schule, 31, 1982, No. 4, pp.145-148.
2 tabs.

An understanding of evolution makes an important contribution to worldview education. An understanding of its philosophical aspects assumes explaining materialistic aspects. The authors provide a model of such an explanation based on the example of the transition from fishes to the first terrestrial vertebrates. The authors stress interdisciplinary aspects of the problem.

instruction + general biology, worldview model, phylogeny, vertebrates - GDR - 147307.

580. GERARDINI, A.C.:
Biologia II
Scuola e didattica, 26, 1980-1981, No. 10, pp. 74-75,
1 graph, 1 fig.

An exposition of the theory of development of life on Earth assumes a biochemical analysis for which biochemical experiments done with pupils are suitable; the author describes some of them.

instruction + general biology, phylogeny, biochemistry, practical excercises - 147307.

581. GERARDINI, A.C.:
La teoria cellulare (Cellular theory)
Scuola e didattica, 26, 1980-1981, No. 11, pp. 69-70

Among the basic theories which belong to the structure of biology as a sciences is cellular theory which the author teaches by providing a survey of the historical concepts of the cell, beginning with the 16th and 17th centuries, up to Virchow in 1858. Practical work in cellular theory requires the use of microscope.

instruction + general biology, cellular theory, Italy - 147307.

582. GERARDINI, A.C.:
Sopravvivenza e ambiente (On survival and the atmosphere)
Scuola e didattica, 26, 1980-1981, No. 12, p. 131-132, 1 tab.

One of the basic characteristics of living organisms is their ability to reproduce. The subject-matter of the article is the development of the embryo and the laws of heredity which are connected with its development. The author also discusses statistical laws of heredity and the study of various characters. Also a historical survey of the development of embryology is given. In conclusion the author describes various projects undertaken by pupils within the framework of studying this subject - for instance a statistical questionnaire on hereditary characters within a family.

instruction + general biology, genetics, embryology, practical excercises - 147307.

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583. GERARDINI, A.C.:
Spravvivenza e ambiente II (On survival and the atmosphere - part ii)
Scuola e didattica, 26, 1980-1981, No. 13, pp. 49-51.
2 figs.

A more detailed exposition of the theory of heredity, including a description of Mendel's work and the further development of the theory by Correns, de Vries, Tschermack, van Beneden and Sutton. The main purpose of this teaching unit is to achieve an understanding of the transmission of characteristics from one generation to the next. At the same time the great variability of organisms is stressed and hence their tolerance towards the environment and human intervention into it.

instruction + general biology, genetics, history, preparations for teaching - 147307.

584. GERARDINI, A.C.:
Sopravvivenza e ambiente III (On survival and the atmosphere - part III)
Scuola e didattica, 26, 1980-1981, No. 14, p. 72.

In this part of the article the author discusses how the atmosphere as part of the environment influences the variability of individuals of the same specie and the problem of survival and adaptation which is connected with this phenomenon. A general exposition is accompanied by several interesting examples concerning the specialization and differentiation of specific plants (for instance trees) on the basis of the specific conditions found in their environment. In this context phylogeny is explained on the basis of the ancestors of extant species and fossil findings.

instruction + general biology, evolution adaptation, phylogeny + plants, preparation for teaching - 147307.

585. GUILLARD, E.:
Qu'est-ce une biocénose ? (What is a biocoenoses ?)
Biologie, Géologie, 69, 1982, No. 1, pp. 232-233.

The author cites various definitions of a biocoenoses, beginning with Möbius in 1877, Wautier in 1949, Dajoz in 1970, Remade in 1974, Dussart and Molinier in 1975 and Le Breton in 1978. Comparing these definitions yields very interesting results and on their basis students can attempt to formulate their own definition. It is interesting to note that Möbius in 1877 and Le Breton in 1978 both stress the reciprocity and equilibrium of the environment as the basic characteristic of a biocoenoses. A community of plants and animals maintains equilibrium of the environment through their mutual interaction.

instruction + general biology, ecology, biocoenoses, preparations for teaching - 147307.

586. KHRIPKOVA, A.G. - KOLESOV, D.V.:
Materialy k teme "Razvitie chelevecheskogo organizma" (Material for the topic "The development of the human organism")
Biologiya v shkole, 56, 1982, No. 2m pp. 44-47.

The individual development of a human is taught in the topic "Hygiene and sex education of pupils" and in the topic "The development of the human organism." Both topics are based on a clarification of the sexual reproduction of humans. The human organism develops from a fertilized zygot when a human egg is penetrated by a sperm. The embryo develops in the womb, where a placenta forms. Pupils study the development of the embryo during the 280 days of its development. Postembryonal development can be divided into childhood (until the age of 10), completing growth (11 to 15) and young adulthood (16 to 18). The authors describe individual stages of development and stress changes which occur in the structure and function of various organs in the body. They also discuss childhood diseases.

instruction + human biology, ontogeny, preparations for teaching - 147307.

587. JACHYMCZYK, W.:
Replikacja DNA (The replication of DNA)
Biologia w szkole, 35, 1982, No. 3, pp. 141-148.

The article describes the replication of DNA and deals with the problem of the structure and shape of various segments of DNA which make replication possible. Replication begins in a precisely defined place and is controlled by a long multi-enzymatic complex. The author also discusses the triggering of the replication process, its precision, the replication of DNA in eukaryont cells and the creation of chromatin.

instruction + general biology, molecular biology, DNA, preparations for teaching - 147307.

588. JÁSZBERÉNYI, J.:
Kutatási módszer alkalmázása a molekuláris biologia tanitássában (The use of a research method in teaching molecular biology)
A biologia tanítása, 21, 1982, No. 1, pp. 15-17.

The study stresses that as a consequence of scientific progress school teaching methods should also be modified, including biology and even more molecular biology. Students should learn that experiments represent the basic form of biological research and learn the basic ways of carrying them out. The experiences of a group of students at the secondary Chemical Technical School in Debrecin, who took an elective course in molecular biology, indicates that the students considered logical thinking to be the most important method of learning research in science. Other authors, for instance Folk, do not think that methodology is clearly primary. Individual steps in an experiment are the following: 1) studying the problem on the basis of observations, 2) studying problems connected with the main problem and the arousal of interest, 3) defining the problem, 4) formulating a hypothesis, 5) preliminary implementation of logic in relation to hypothesis, 6) carrying out the experiment, 7) interpretation of findings and organising data. A knowledge of chemistry is crucial for correctly understanding molecular biology.

instruction + general biology, molecular biology, methodology + science, preparations for teaching - 147307.

589. JONES, G.A.:
Mechanics of Osmosis - An Alternative Theory with a Working Model
The School Science Review, 63, 1982, No. 224, pp. 483--487. 2 figs., 3 tabs.

Osmotic pressure is caused by the bombardment of scattered molecules on a solution's surface. The author has developed a theory on the basis of which it is possible to clearly demonstrate this phenomenon on the basis of a simple apparatus he has designed. He describes the method of its use in several ways and the findings which indicate the validity of his theory. The apparatus is simple; it is composed of two glass vessels and small syringes. The pictures attached to the article show how the experiment, on the basis of this apparatus, proceeds.

instruction + general biology, osmosis, experiment, preparations for instruction - 147307.

590. KNEY, D.:
Den Schülern die Materialität der Vererbungsprozesse bewusstmachen (Demonstrating to pupils the material nature of heredity)
Biologie in der Schule, 31, 1982, No. 5, pp. 190-192.

If pupils are to understand the material nature of heredity, the teacher must take a materialistic stand, teaching must be carefully prepared, be ostensive and pupils must be suitable motivated. The author makes these prerequisites more specific in two teaching topics: an introduction to genetics and the structure of DNA as the carrier of genetic information.

instruction + general biology, molecular biology, genetics, preparations for teaching - 147307.

591. KÖPPL, R.:
Wahrscheinlichkeitsrechnung in der Genetik (Probability calculus in genetics)
Der Biologieunterricht, 18, 1982, No. 3, pp. 42-80.
18 figs., 4 tabs., lit. 20.

Biology as a science increasingly uses some fields of mathematics. Pupils should also become acquainted with the use of mathematical methods in biology within the framework of suitable topics. The first use of mathematics in biology is very old - already in the 13th century Leonardo di Pisa, also called Fibonacci, used mathematics to describe the reproduction of rabbits. During the last century mathematics found their permanent place in biology - in the genetics of Mendel´s laws. At present the Hardy-Weinberger law is used to solve problems concerning population genetics, as well as ecological problems, mathematical epidemiology, etc. Biology thus becomes more precise. The article attempts to explain to pupils the principles of the Hardy-Weinberger law of genetic populations. The probability calculus taught in schools should provide a sufficient mathematical apparatus for understanding probability in nature.

instruction + general biology, genetics, genetics + population, history, probability calculus, preparations for teaching - 147307.

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592. LETKO, E.:
Farbosleposť a hemofília očima genetika (Colour blindness and hemophilia as seen by a genetist)
Přírodní vědy ve škole, 33, 1981-1982, No. 4, pp. 87-89.
3 figs., lit. 3.

Two basic disorders which are linked with sex chromosomes are hemophilia and colour blindness. The author describes the history of discovering colour blindness and some of its forms, the heredity of this disorder and outlooks for progeny. Also the discovery of hemophilia is briefly described, its heredity and its incidence in Slovakia. J. Dalton who gave the first accurate description of colour blindness at the end of the 18th century suffered from the disease,as did his brother. Approximately 4 to 6 % of the population is colour blind,men much more frequently then women. The inability to see the blue colour is called tritanopia and is more frequent than protanopia, the inability to see the red colour or deuteranopia, the inability to see green. Of course also non-hereditary disorders of colour sight exist, based on intoxication, disease of the organism or the use of drugs. The author then discusses the genetic and hereditary aspects of hemophilia and the frequency of its incidence. According to new findings hemophilia is caused by two different molecular disorders, which are both hereditary and are localised at various sites of the sex chromosome X. According to medical data, one man in 6300 has hemophilia. Women do not suffer from this disease, but the disease is transmitted only by women, even when their husband is healthy.

instruction + human biology, genetics + disorder, chromosomal abberation, preparations for teaching - 147307.

593. LITSCHE, G.:
Theoretische Biologie und Unterricht über die Abstammungslehre (Theoretical biology and teaching phylogeny) Biologie in der Schule, 31, 1982, No. 5, pp. 197-203. 5 figs.

The author here provides a logical outline of the structure of the teaching topic "Phylogeny", which according to his own experiences is very well applicable to practical class work. His aim is to create a didactically concieved outline of evolution. He first precisely defines the term "specie", then introduces various evolution factors such as mutations, natural selection and their effect on the evolutionary process. Special attention is devoted to isolation as an evolutionary factor and the theoretical explanation of adaptation. In conclusion the author explains that evolution is a necessary aspect of life.

instruction + general biology, evolution theory, phylogeny - 147307.

594. LONGDEN, B.:
Genetics - are there Internal Learning Difficulties ? Journal of Biological Education, 16, 1982, No. 2, p. 135-140. 2 figs.

Some of the sources of misunderstandings and learning difficulties in secondary school students concerning genetics have been made the subject of a study project based on depth interviews and discussions which clarified specific problem areas. It was found that misunderstandings are based above all on a lack of understanding of a genetic term or notion. Some of the questions given to students concerned the educational shortcomings of the teacher, whose exposition was not comprehensive or too often interrupted, so that students lost the chain of thought. The author discusses the didactical aspects of some of the most difficult passages of this section of the teaching syllabus such as DNA, chromosomes, chromatids, etc.and demonstrates that a well thought out and carefully prepared exposition of basic notions makes it possible for students to overcome the above describes difficulties in learning genetics.

instruction + general biology, genetics, forming of notions, study project + knowledge -147307.

595. LÖTHER, R.:
Darwin heute (Darwin today)
Biologie in der Schule, 31, 1982, No. 4, pp.129-136.

The name of Charles Darwin is connected with a decisive blow to metaphysical and idealistic concepts in biology. His discoveries concerning evolution have led to the creation of a descendency theory, which approaches evolution as objectively existing reality, as an unequivocal fact; evolutionary theory reveals factors, forces and the laws of development of this process. The author first describes the origins of the descendency theory and of evolution theory. In conclusion he discusses problems connected with the modern stage of evolution.

instruction + general biology, evolution, evolutionary theory, preparations for teaching - 147307.

596. MACIEJOWSKI, J.:
Czym sie zajmuje genetyka populacji (What is the subject-matter of population genetics ?)
Biologia w szkole, 35, 1982, No. 3, pp. 154-157.
Lit. 4, tab. 3.

Recessive characters can dominate in a population over dominant characters, for instance horned cattle predominates over horn-less, in spite of the fact that horns are a recessive character. A similar situation is in the O blood group (a recessive character) which predominates over other blood groups. But these characters do not limit survival or the chance of maintaining progeny. An equilibrium of characters in a population is influenced by a number of factors, for instance mutations, the migration of individuals to another population, genetic drift, random deviations in the frequency of expected and actually occuring characters in small populations, as well as natural and artificial selection.The mechanism by which all these factors influence a population are very important also for human intervention in the form of animal breeding.

instruction + general biology, genetics + population, preparations for teaching - 147307.

597. MAHADEVA, M.N. - RANDERSON, S.:
Mutation Mumbo Jumbo
The Science Teacher, 49, 1982, No. 3, pp. 34-38.

Most biology teachers are not satisfied with the explanations of mutation provided by most biology textbooks. In the authors´ opinions it is best to explain mutation by describing the history of this notion. It was first used by de Vries in 1911 in his work "Mutationstheorie". But the term was then further developed with the development of scientific research. H.J. Müller in 1927 described mutations of the Fruit fly. The authors go on to describe the opinions of other authors and discuss whether mutations are good or bad for an organism; they criticise incorrect opinions concerning the dominant or recessive nature of gene bonding.

instruction + general biology, genetics, mutation, preparation for teaching - 147307.

598. MATZKE, M.:
Vorschläge zur Gestaltung der Stoffeinheit "Bedeutung der Biologie" (Klasse 10). (Suggestions for teaching the topic "The significance of biology" in the 10th class)
Biologie in der Schule, 31, 1982, No. 5, pp. 184-190.
2 tabs.

This topic provides an opportunity for pupils to achieve an understanding of the practical application of the biological sciences. The author discusses in detail the concept of teaching the topic cited in the title and suggests assignments which can be given to pupils for independent work, as well as teaching media which can be used, etc.

instruction + biology, science + significance, preparations for teaching, 10th class, secondary school - 147307.

599. MATZKE, M.:
Zur Gestaltung des Stoffgebietes "Die Züchtung von Pflanzen und Tieren" (Klasse 10). (Concerning the concept of the teaching unit "The cultivation of plants and breeding of animals" in the 10th class)
Biologie in der Schule, 31, 1982, No. 4, pp. 151-155.
2 tabs.

Great stress is placed on the quality of instruction of the topic cited in the title, because the breeding of animals and the cultivation of plants represent specific factors for the intensification of agricultural production in the German Democratic Republic. Pupils should be able to use the knowledge they gained previously, when learning genetics and phylogeny; also polytechnical applications are important. According to the teaching syllabus, 7 lessons are devoted to this topic, but the author's version requires only 6 lessons, as has been practically verified. The article contains the detailed methodology of 2 lessons devoted to breeding methods (selection, mutation, cross-breeding). For each lesson, links to previous lessons are cited, as well as formulations of objectives and methods.

instruction + genetics, phylogeny, plant cultivation and animal breeding, preparations for teaching - 147307.

600. MICHELL, R.H. et al.:
Widely Accepted Modern Views of Cell Structure are Fundamentally Correct: A Reply to Hillmann and Sartory
The School Science Review, 63, 1982, No. 3, pp. 434-441.
2 figs.

The article is a rejoinder to opinions expressed by the authors cited in the title concerning the cellular

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membrane and the function of the cell. The authors of this article accuse Hillmann and Sartory of publishing incorrect ideas concerning the organization of a cell and reject their opinion that electrone microscopy is not a valid technique for cell studies. They discuss lysosomal enzymes and the endoplasmatic lattices which were discovered by electronic microscopy (a magnification of 25 000).

instruction + general biology, molecular biology, cell, preparation s for teaching - 147307.

601. MORGENSTERN, G.:
Den Schülern das Zusammenwirken der Evolutionsfaktoren verständlich machen ! (Pupils should have the mutual interconnection between evolutionary factors explained to them !)
Biologie in der Schule, 31, 1982, No. 4, pp. 142-145.
1 fig.

The author analyses the teaching topic "Phylogeny" which is taught in the 10th class and shows how pupils have difficulties in applying the knowledge they learn in ecology and genetics when explaining the evolution of an organism. This is true especially for explaining the complex effect of all evolutionary factors. The author demonstrates how a teacher can explain the complex effect of evolutionary factors in a specific environment on the development of the species and which knowledge from ecology and genetics should be reactivated. Two teaching lessons are analysed from this point of view.

instruction + general biology, evolution theory, phylogeny, preparations for teaching - 147307.

602. PAGLIARI, M.:
Il problema degli equilibri naturali I. (The problem of natural equilibrium - part I.)
Scuola e didattica, 26, 1980-1981, No. 12, pp. 43-44.
2 figs.

After the topic of the natural environment, the topic of natural equilibrium is very important. It is first necessary to explain to pupils various levels or forms in which such an equilibrium exists - for instance the physical environment (unpolluted air, water, soil, etc.), or a specifically human environment (for instance the consequences of negative urban development, the psychological consequences of unhealthy life rhythms, noise, etc., demographic fluctuations connected with crises in human nutrition, contradictions in economic development among nations, classes or strata in society, etc.) and finally equilibrium in the technical environment which includes such aspects as the extant stores of raw materials, energy sources, the backwardness of agriculture, etc.

instruction + general biology, ecology, environment, preparations for teaching - 147307.

603. PAGLIARI, M.:
Il problema degli equilibri naturali - II. (The problem of natural equilibrium - part II)
Scuola e didattica, 26, 1980-1981, No.13, pp. 36-38.

The article analyses various cycles of natural disequilibrium due to human intervention which causes toxic pollution of the environment. The author cites DDT, mercury, polychlorbiphenyl, water pollution by artificial fertilisers and the special effect of making waters eutrophic where a shortage of oxygen in the water is the outcome of the proliferation of green algae, which in turn is the outcome of too much phosphorus and nitrates in water.

instruction + general biology, ecology, environment, preparations for instruction - 147307.

604. PIOTROWICZ, M.:
Strukturyzacja treści genetycznych (The structuralization of genetics)
Biologia w szkole, 35, 1982, No. 3, pp. 181.185.
4 tabs., lit. 9.

The author provides the outline of 2 lessons in the 4th (final) class of general education secondary schools, devoted to a repetition of the genetics course, which concentrate on the topics "Mechanism of transforming characters and types of variability" and "The utilization of findings in experimental genetics." The main purpose of the lessons is to deepen pupils' understanding of the notions of heredity and variability and the importance of heredity in interpreting evolutionary mechanisms. A table provides a survey of various genetic terms. The purpose of the repetition is to underline for pupils the importance of practical applications of experimental genetics in agriculture, medicine and elsewhere.

instruction + general biology, genetics, evolution, preparation for teaching - 147307.

605. PRIESTLAND, R.N.:
A Method for Demonstrating Genetic Principles Using an Imaginatory Organism
Journal of Biological Education, 16, 1982, No. 2, pp. 141-143, 2 figs.

The article describes the use of an imaginatory organism for explaining the principles of genetics. Practical genetic work is divided into two stages, the development of the organism and the characteristics of various phenotypes and a numerical analysis and interpretation of findings. All this is carried out with the help of small black and white symbols as carriers of various genetic characters. This method prepares pupils for work with live material and enables them to gain experience, without which work with living material could lead to disappointments. This "paper" method allows carrying out "experiments" which simulate living material.

instruction + biology, genetics, experiment + simulation, Great Britain, preparations for instructions - 147313.

606. PUTRAMENT, A.:
Jak badamy dziedzicznie cech u ludzi (How we study heredity characters in people)
Biologia w szkole, 35, 1982, No. 3, pp. 177-178.

It is not possible to carry out genetic experiments with F_1 and F_2 generations in humans. Such experiments can be replaced by the study of family trees. The author here demonstrates such a study, which concentrates on the following genetic characters: when the hands are clasped together some people have the right thumb uppermost, which is a recessive character, while a left thumb uppermost is a dominant character. The incidence of the disease hemophilia, when blood does not clot properly, is also a hereditary character. Its incidence can be traced in a family tree with the aid of a graph.

instruction + biology, genetics, human biology, experiment, Poland - 147313.

607. PUTRAMENT, A.:
Podstawowe elementy wiedzy genetycznej (The basic elements of genetics as a science)
Biologia w szkole, 35, 1982, No. 3, pp. 164-170.

The article provides basic information to teachers concerning the terms used in genetics and is meant as a substitute for basic didactical literature on this subject of which there is a shortage. The experiments done by Gregory Mendel are described and the progress made by genetics in the twentieth century, as well crossing-over, the heredity of sex and sexual characteristics, the molecular principles of genetics, mutations and their dependency on genes.

instruction + biology, genetics, Gregory Mendel, Poland - 147313.

608. PUTRAMENT, A.:
Regulacja funkcji genów (Regulating the function of genes)
Biologia w szkole, 35, 1982, No. 3, pp. 137-141. 1 fig.

A gene is a section of DNA which contains information on the sequence of aminoacids in proteins. The gene's function is to express a phenotype which creates protein in a cell through the gene's code. The basic stages in which a gene is expressed is the transcription, i.e. the synthesis of RNA and the translation, i.e. the controlled synthesis of protein through RNA. If the phenotype expression of all genes in sexual cells were the same, all the cells developed from it would be the same, they would not differentiate in the organism and would not develop into sexual cells. Thus in higher organisms the expression of genes must differ. The transcription of each gene begins in a specific place, designated as a promotor which is catalyzed by the enzyme RNA polymerase. So far we do not know enough about the function of genes in the course of development of an organism, since some genes exert an influence during this whole time, while others only is some stage of ontogeny. Hormons also have an important role to play in the regulation of genes. Neoplasms develop when the rhythm of cell division is distorted. A study of this rhythm is thus important for both medicine and animal husbandry.

instruction + biology, genetics, Poland - 147313.

609. VAN RAALTE, C.:
Nitrogen Fixation by Non-leguminous Plants
The American Biology Teacher, 44, 1982, No. 4,
pp. 229-232 and 254. 3 figs., 2 tabs.

The author specializes in plants with nitrogen fixating properties, which are very important for agriculture, but are rather neglected by biology courses. These crops are especially important in poor quality soil because the plants live in symbiosis with bacteria which are capable of nitrogen fixation; the bacteria obtain organic substances from the plant and provide it with nitrogen found in the aminoacids produced by the bacteria. This subject matter is described by the author on the example of specific plants, for instance Alder trees and others.

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instruction + biology, botany, plant physiology, assimilation, nitrogen, USA - 147313.

610. RADFORD, A. - BIRD-STEWART, J.A.:
Teaching Genetics in Schools
Journal of Biological Education, 16, 1982, No. 3,
pp. 177-180.

The authors admit that understanding genetics is not an easy task, but in view of its importance, it should play an prominent role in the biology course. Since this subject is also important for the life of the individual, everything should be done to improve teaching. The authors discuss various experiments which can be undertaken with students and also the qualities of various textbooks on this subject. Also evolution theory is briefly mentioned as the only scientific theory for explaining the development of the species.

instruction + biology, genetics, experiments, evolutionary theory, Britain - 147313.

611. RICKEN, W.:
Vom Gen zum Merkmal (From gene to character)
Biologie in der Schule, 31, 1982, No. 1, pp. 35-37.
1 fig.

A number of genetic terms are very difficult for pupils to understand. Problems arise especially when individual processes are to be understood together. The author demonstrates this on the basis of explaining the principles of heredity of various colours of flowers.

instruction + biology, genetics, experiments - 147313.

612. STATKEVICH, N.V.:
K planirovaniyu uchebnogo materiala temi "Darvinizm"
(On planning the teaching of the topic "Darwinism")
Biologiya v shkole, 56, 1983, No. 4, pp. 44-50. 3 tabs.

"Darwinism" is an important topic taught in the 9th class. It is important from the point of world-view and atheist education, as well as the cognizance of the world and its laws. In this topic pupils learn about the evolution of the organic world and become acquainted with the notion of a specie, population, micro and macro-evolution, relations between factors of evolution, causes and effects, artificial and natural selection, adaptability, the breeding of new species of plants and animals, etc. Teaching this topic is planned for 14 lessons; of this number one lesson is devoted to an excursion and one lesson to a summing up of the whole topic. The author briefly describes the subject-matter of lessons one to seven.

instruction + general biology, evolutionary theory, scientific worldview - 147313.

613. SZATKEVICH, N.V.:
K Planirovaniyu uchebnogo materiala temi "Darvinizm"
(On planning the teaching of the topic "Darwinism")
Biologiya v shkole, 56, 1982, No. 5, pp. 32-36.

A continuation of an article begun in the previous issue of the same magazine. In this article the author analyses the subject-matter of lessons 8 to 14 of a 14-lesson unit which deals with Darwinism in the biology course. He also discusses teaching aids, homework and pupil assignments for the whole topic.

instruction + biology, Darwinism, evolutionary theory, teaching media, USSR - 147313.

614. STAVROVA, P.:
Metodicheska razrabotka na temata "Dvizheshchi sili na antropogenezata" (A methodological outline for the topic "The moving forces of anthropogeny")
Biologiya i khimiya, 25, 1982, No. 5, pp. 26-30.

The teaching syllabus for the 9th class assumes that the teacher has extensive theoretical knowledge, as well as experiences in methodology and adequate teaching aids and media. Here the author provides methodological advice concerning the topic "The evolution and development of man" - which is divided into two teaching lessons: 1) the moving forces of anthropogeny and 2) the recall of what pupils have learnt previously - proof of evolution, basic trends in the evolutionary process and the development of the organic world. Next pupils should be given questions and recommended literature on this subject-matter. The first part of the first lesson should have the form of a discussion, where the subject of the animal ancestors of man are discussed and proof is cited from embryology, physiology and genetics. In the second lesson pupils on the basis of a comparative method discover related and differentiating characteristics of man and his animal ancestors. Finally the conclusion should be arrived at that labour was the moving force of anthropogeny, which led to the freeing of the hand and the development of thinking and this in turn led to a qualitative transformation of an animal into a social being.

instruction + biology, human biology, anthropogeny,
Bulgaria - 147313.

615. STEWAERT, J.:
Difficulties Experienced by High School Students When Learning Basic Mendelian Genetics
The American Biology Teacher, 44, 1982, No. 2, pp. 80-84 and 89., 3 figs., 5 tabs.

It has been found that Mendelian genetics are difficult for high school students to understand. The author analyses these difficulties and suggests a scale of difficulty with 15 items and a scale of importance of the knowledge for understanding this field of biology. On the basis of interviews with students, she drafts expositions which are more easily comprehensible then those provided by most textbooks. Special attention is devoted to the algebraic expression of cross-breeding; the author pinpoints errors made by students.

instruction + biology, genetics, high school, USA - 147313.

616. SURAVEGINA, I.T.:
K metodike prepodavaniya temi "Osnovi ekologii" (Obshchaya biologia 10. klass) (On the methodology of teaching the topic "The foundations of ecology" in general biology in the 10th class)
Biologiya v shkole, 56, 1982, No. 6, pp. 25-29. 1 tab.

The article provides methodological instructions on the subject "Basic factors in the climate and the adaptation of the organism to them". This is a rather broad topic and some of its aspects have already been the subject of learning in geography, physics, chemistry and other parts of the biology course, since this topic has a strongly interdisciplinary aspect. The author stresses the use of various teaching media, for instance herbariums, drawings, photographs and other ways of demonstrating to pupils the influence of the climate and its changes on living organisms. Individual elements of the climate are analysed (light, temperature, humidity) and its various aspects which are abiogenic - for instance the amount of solar radiation, circulation of the atmosphere, the surface of the soil, precipitation, the wind, etc. This is a typical situation where knowledge gained in other subjects can be made use of, within the framework of ecology.

instruction + biology, ecology, secondary school, interdisciplinary links - 147313.

617. TOLMAN, R.:
Difficulties in Genetics Problem Solving
The American Biology Teacher, 44, 1982, No. 9,
pp. 525-527, 2 tabs.

The Centre for the Study and Assessment of Instruction selected 30 younger and older high school students and gave them three genetics questions:
1) the cross-breeding of mono-hybrids, 2) domination,
3) controlled heredity. The students were asked to answer the questions orally and their answers were tape recorded. It was found that one of the greatest difficulties was a correct understanding of the terms used and understanding that pairs of allels in offsprings are the outcome of the transition of one allel from each parent. Only 6 out of 30 students were able to explain the problem correctly. The author describes and comments other answers, which were also not entirely satisfactory.

instruction + biology, genetics, high school, verification + knowledge - 147315.

615. VLAKHOV, S.:

Parazitni vzaimootnosheniya mezhdu mikroorganizmi

(Parasitical relations among microorganisms)

Biologiya k ihimiya, 25, 1982, No. 5, pp. 4-8, 2 figs.

Parasitism is a type of mutual relation among organisms where one specie lives at the expense of the other. It is found among microorganisms, as well as among higher organisms. Some parasites are obligate, while others are facultative. The former reproduce only in the living tissue of plants, animals or man and cannot be cultivated in an artificial environment. The latter usually eat dead organic substances, but under specific conditions they can cause disease of plants and animals. Such organisms can be cultivated in an artificial environment made of organic and mineral compounds. The best known example of an obligate parasite are viruses and bacteriophages. The latter attack various species of bacteria. Their contact with the cell of a bacterium has 4 stages: absorption, penetration of cell, reproduction within cell, exit from cell. The author cites the example of Bdellovibrio bacteriovorum as an example of one bacterium parasiting on another and describes its penetration into host cells and the further stages of its cycle. Other examples of obligate parasitism are the fungi Trichothecium, Arthrobotrys and Dactylella, which parasite on tiny worms.

instruction + biology, general biology, parasitism - 147313.

619. WENIG, K.:

Darwinismus - Entwicklung einer Theorie (Darwinism - the development of a theory)

Biologie in der Schule, 31, 1982, No. 4, pp. 161-165.

The principle of evolution is reflected not only in biology, but also in the other natural sciences. In the history of biology, evolutionary thinking has a long tradition (Leibniz, Kant, Buffon, Oken, Lamarck). Of Darwin's discoveries, the following proved to be most important from the point of view of the development of evolution theory: his rejection of the constancy of the species and his acknowledgement of variability; only the "fittest" are successful in the struggle for survival; the elementary unit of evolution is not an individual but a population; the very important role of inter-specie relations. The Church of England made the first attack upon the new theory, since living nature was the last stronghold of its teachings on Creation. The author also describes the reaction of biologists and philosophers towards Darwin's theory and the forming of a comprehensive evolution theory which began to be formed in the USSR in the twenties as a synthesis of classical and modern trends of development. The final synthesis between Darwin and Mendel was carried out by T. Bobzhanskiy in his book published in 1937.

instruction + biology, Darwinism, evolutionary theory, history - 147313.

620. WIZNER, A.:
Den Schülern den statistischen Charakter der Mendelschen Gesetze bewusstmachen ! (The statistical nature of Mendel´s laws should be clarified for pupils !)
Biologie in der Schule, 31, 1982, No. 10, pp. 416-417.

If pupils are to understand the statistical nature of Mendel´s laws it is best to use a three-dimensional model. Statistical laws represent relations between the behaviour of a system and the behaviour of its elements (in the case of Mendel´s laws, the transmission of characters to subsequent generations are described and the manifestation of these characters in an individual). The statistical nature of Mendel´s laws is analysed and described in detail.

instruction + biology, genetics, method + statistics, law + heredity - 147313.

621. WOLF, G.:
Kann das menschliche Gehirn sich selbst begreifen ? Möglichkeiten und Grenzen der Hirnforschung
(Can the human brain understand itself ? The possibilities and limits of brain research)
Biologie in der Schule, 31, 1982, No. 1, pp. 41-44.
1 fig.

The human brain is a unique product of evolution. However, a number of data concerning the brain have been obtained indirectly, by studying animals. Great strides have been made especially in the study of neurons. Already 10 different types of transmitters have been discovered and approximately 40 neuropeptides which act as modulators. Another interesting finding is the fact that information can be transmitted from dendrite to dendrite, as well as the discovery of entirely new types of receptors in presynaptic transmitters. The highly complex structure of the brain, which is the outcome of mutual interconnections between neurons, makes possible the existence of the memory, associations, emotions, motivation, etc. The total area of synapses in the brain is equal to 500 km^2 and their detailed study would require 280 million years of an individual's work.

instruction + human biology, phylogeny + man, evolution, brain - 147313.

12.25 Preparations for ecology instruction

622. ADAMS, J.:
Woodlands as an Introduction to Ecology
Journal of Biological Education, 16, 1982, No. 4,
pp. 293-296. 3 figs., 6 tabs.

A part of the former Royal Forest in Essex has now become a wildlife conservation area. The author regularly takes her students to this area to teach them the foundations of ecology on the basis of specific examples. Among the methods she uses is a detailed study of an area 30 x 30 meters where students work independently on various assignments they recieve beforehand. An assessment of the work done is carried out during discussions in class, where the tables and graphs prepared by students are shown. This type of project is a highly productive supplement to classroom instruction.

instruction + biology, ecology, field work, Great Britain - 147313.

623. DRANSFELD, K.:
Vorschläge zur Einführung und Gestaltung der Stoffgebiete der Ökologie in Klasse 9 und 11 (Suggestions for introducing thematic units on ecology into instruction in the 9th and 11th classes and their basic concept)
Biologie in der Schule, 31, 1982, No. 2/3, pp. 70-74.
1 fig.

Increased attention is now devoted to ecological problems. Increased attention should, however, also be devoted to the system aspects of ecological phenomena; in the teaching syllabus for the 9th class only two examples of ecological systems are cited and in the teaching syllabus for the 11th class another is added. The author provides a critical analysis of the teaching syllabi and the teaching of ecological notions which begins with the individual and ends with the biosphere. In conclusion the author cites his own suggestion for the structuralization of ecological subject-matter in the 9th class.

instruction + biology, ecology, secondary school, structuralization + teaching syllabus, GDR - 147313.

624. FRITSCH, H.:
Verständnis für Ökologie durch ein Gedicht (An understanding of ecology with the aid of poetry)
Biologie in der Schule, 31, 1982, No. 2-3, pp. 75.

The teaching syllabus for the 11th class biology course includes a topic where food chains are described. The author sought ways for making this subject-matter more interesting for pupils. With the help of his pupils he found a poem, published in 1803, which very well describes food chains. The pupils enjoyed this type of

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work and better remembered the problem taught.

instruction + biology, secondary school, ecology, eco-system, food chain, GDR - 147313.

625. GRAY, N.F.:

The Use of Percolating Filters in Teaching Ecology

Journal of Biological Education, 16, 1982, No. 3, pp. 183-186. 1 fig., 1 tab.

A permanent place for ecological studies is the ideal of every biology teacher. In urban areas parks serve well and in rural areas there is a wide selection of places. But an overlooked area can be found directly in the classroom when a percolating filter is used to cultivate bacteria and fungi, as well as other micro-organisms and also some larger organisms. The amount of biological material for biology practical excercises provided in this way is without limit. The author provides a table of various organisms which can be cultivated in this way. When the filters are left outdoors (in the school garden or elsewhere) they can also prove to be useful. The author also provides a drawing of the filter adjustment, which requires minimal costs.

instruction + biology, ecology, method + experiments, Great Britain - 147313.

626. HECK, I.:

Die Fähigkeit des Staunes und Sichwunders als Voraussetzung für ökologisches Denken und Handeln im Bereich der Schule (The ability to be astonished is a prerequisite for ecological thinking and behaviour in school)

Der Biologieunterricht, 18, 1982, No. 2, pp. 41-51.Lit.7.

Human intervention causes damage to the environment. Teachers, however, are in a position to contribute to teaching pupils and making them understand the causes of this negative behaviour of man and to lead them towards ecological thinking which at present and especially in the future will contribute to the preservation of the human environment, as well as that of plants and animals before total destruction. The main sources of the negative thinking and behaviour existing in contemporary society, in the opinion of the author, are widespread convictions concerning the necessity of constant growth and progress, the tendency of many to consider only the short-term, the existence of many individuals who do not have a developed sense of responsibility for the environment and hence the development of destrutive behaviour. Also some technical aspects have not yet been solved in a satisfactory manner, for instance the disposal of waste. The ability of young people to be astonished by what they learn should be made use of to organize creative ecological activities in the vicinity of the school and elsewhere.

instruction + biology, ecology, methods + teaching,
GDR - 147313.

627. KIRCHEVA, A.I. - NIKOLOVA, M.K.:
Osshchestvyavane na mezhdupredmetni vrzki v urotsite "Ekosistemi na stepite, savnite i pustinite" (The implementation of interdisciplinary relations in the topic "The eco-system of the steppe, savanah and desert). Biologiya i khimiya, 25, 1982, No. 3, pp. 52-55, 6 tabs.

An important trend in the contemporary educational system is the interdisciplinary nature of the subject-matter taught. Ecology is one of those sciences in which interdisciplinary aspects are very important and they should be stressed in instruction, especially when we are dealing with relations between nature and society.

The topic cited in the title is here analysed from this point of view for instruction in the 7th class. Elementary knowledge in this subject is learnt by pupils already in the 1st to 3rd classes, then in the 4th class in the natural sciences, in the 5th class in physical geography and in botany and zoology. For recalling this knowledge the author suggest the use of transparencies on an overhead projector which have various questions, as well as their answers in the form of tables, etc. The new subject-matter dealt with should include the following subjects:

- plant communities and natural zones;
- the spreading of plants and animals on Earth;
- various examples of mutual relation between them;
- the role of plants in an eco-system;
- various types of plant communities.

When the pupils have learnt all the required terms and notions, they are then able to describe the eco-systems in the steppe, savanah and desert from the point of view of geography, zoology and botany and then form a complex image of the eco-system as a whole.

instruction + biology, ecology, natural communities, interdisciplinary relations, Bulgaria - 147313.

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628. KLEIN, H.P.:
Ökologie im Unterricht (Ecology in instruction)
Der Biologieunterricht, 18, 1982, No. 2, pp. 52-60.

The author offers comments on ecology teaching. Everyday ecological problems which are connected with a loss of equilibrium in the environment, as well as the history of ecological developments (for instance the disappearance of forests in the area surrounding the Mediterranean sea), require that schools devote increased attention to ecology. The questions is which subjects are suitable to acquaint pupils with ecology. Ecology can be taken as a principle of teaching and then it should be taken into account by all teaching subjects or as an independent teaching subject with a strongly interdisciplinary nature, and this requires the integration of a number of teaching subjects. On the other hand the dispersion of ecology into a number of subjects, as well as the insufficient quality of instruction due to the fact that teachers are not sufficiently qualified in this subject are a threat to success. It should be stressed that teaching ecology is not only the passing on of various information but also attitudes and stands, i.e. it is an educational problem. Ecology and economics often present attitudes which are mutually exclusive; the need to seek equilibrium should be stressed.

instruction + biology, ecology, teaching syllabus, FRG - 147313.

629. SURAVEGINA, I.T.:
K izucheniyu temi "Osnovi ekologii" (On teaching the topic "The foundations of ecology")
Biologiya v shkole, 56, 1982, No. 2, pp. 32-38. 5 tabs.

The topic Foundations of ecology has been newly included into the teaching syllabus for general biology. The topic deals with basic ecological problems and it is of great educational, as well as teaching significance. Pupils learn basic ecological terms and become acquainted with biological systems at the population level. Also the influence of man is shown and his intervention into the environment. This subject-matter is closely connected with the problem of nature conservation and environmental control. Instruction advances from the organism to a population, biocoenoses, bio-geocoenoses and their stability and development. All branches of biology contribute to ecology. The author provides as outline of 10 teaching lessons which include the following topics: the subject-matter of ecology; ecological factors; abiotic climate factors; rhythms in nature; intraspecie biotic factors; interspecie biotic factors; biocoenoses, biogeocoenoses, eco-systems; self-regulation in a biocoenoses and its alternation; anthropogenic factors, agrocoenoses; an assessment of the state and methods of regulation of the size of a population. For two lessons the author provides a detailed analysis.

instruction + biology, ecology + basic terms - 147313.

630. **WINIARSKA, G.:**

Zasady zasiedlania nowych środowisek przez faunę

(The principles of colonizing new environments with fauna)

Biologia w szkole, 35, 1982, No. 2, pp. 71-73. 1 fig., lit. 2.

After natural catastrophes, the eruption of volcanoes, forest fires, the retreat of glaciers, the drying out of water areas or their filling in with soil, new environments are formed which at first do not have any flora or fauna. But very soon this environment is colonized in one of two ways. The first occurs when the new environment is directly connected with an already colonized environment. Then gradually the species found in the old environment spread out to the new one, across the border between them. The second method occurs when no connection between both environments exists because of some barrier. Here colonization leads to the creation of an entirely new type of environment. Dispersion can take place actively or passively. The latter is by the wind or water, the former by flight, etc. Expansive species have some characters which make it easier for them to colonize a new environment. Usually at least one stage in the development of an animal has the ability to disperse, for instance insects in the imago stage. Some insect populations have shown that only part of the population is capable of dispersion. Insects and birds disperse most rapidly and easily; they seek new environments even before their old environment can no longer sustain them or threaten the existence of the population. For insect and bird species which do not fly very well, steep slopes, mountains or high forests may form a barrier. Climate factors, or those concerning

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the available food or lack of sufficient space represent ecological barriers. Reproduction abilities of a specie are important in new colonization; parthenogenic species tend to better colonize new territories. Sometime a single female is sufficient to colonize a new environment. A specie should fulfill three prerequisites for successful colonization: find suitable abiotic conditions, suitable biological conditions (for instance food) and the colonizing specie must arrive at the new location in sufficient numbers to develop and survive. Its progeny then becomes the nucleus of a new population. Among the most important characters for successful colonization are a high population frequency, rapid development, a large dispersion ability in the new environment and a rich gene pool making the survival of the population possible in a different environment. The plastic nature of the genetic foundation of the specie is the most important prerequisite of the development of a new specie in a new environment.

instruction + biology, zoogeography, Poland - 147313.

631. WŁOSIK -BIEŃCZAK, E.:
Przystosowania roślin i zwierzat, konspekt kekcji w klasi IV. (The adaptation of plants and animals. An outline for a lesson in the 4th class)
Biologia w szkole, 35, 1982, No. 2, pp. 107-109. Tab. 1.

The article stresses independent work done by pupils in the topic cited in the title. The article contains outlines for explaining the adaptability of animals to a terrestrial environment, with special stress on food chains. Groups of several pupils receive assignments which can include for instance the following:

How do plants protect themselves before herbivores ? Do some animals use similar methods ? What do plants provide to honey bees ? What do honey bees provide to plants ? Which plants attract bees and other insects ? How to do the seeds of terrestrial plants disseminate with the aid of the wind ? How do touch-me-nots disseminate their seeds ? How do apple and plum trees disseminate their seeds ? What does a cow eat ? How does a cow digest its food ? What does a goshawk eat ? How is it adapted to finding and catching its prey ? A comparison between the beak of a domestic fowl and the goshawk; observations of a wildcat in the zoo - how does it live and what does it eat ? What makes it possible for it to climb trees ? A comparison of the feet of a lynx and a wildcat. What does the Edible frog eat and how does it hunt ? Why should amphibians be conserved in the environment ? Describe the life of a mole and its adaptation to life in the soil. How are animals adapted to a terrestrial life ? Describe the stoat and how it looks in the summer and in the winter. The author concludes with several generalisations: green plants produce food, herbivores consume plants, carnivores consume herbivores.

instruction + biology, ecology, adaptation + environment, Poland - 147313.

13. The outcome of biology instruction

632. GÜNTHER, J.:
Hinweise zur Bewertung bei Leistungskontrolle im Biologieunterricht (Instructions for assessing the outcome of learning in biology instruction)
Biologie in der Schule, 31, 1982, No. 10, pp. 409-413.
1 tab.

Mimics, gestures, verbal judgements and marks can all be used to express assessment of a pupil´s learning. But this assumes the existence of a correct scale. The author discusses how to assess the outcome of learning in written examinations. He cites a scale which includes the aspects of knowledge, mental activity, physical skills and quality of expression.

instruction + biology, outcome + instruction, verification of knowledge, GDR - 147315.

633. MIKLAŠOVÁ, M.:
Otvorená hodina prírodopisu v 5. ročníku (An open nature studies lesson in the 5th class of basic school)
Přírodní vědy ve škole, 33, 1981-1982, No. 2, pp. 49-50

The author describes her experiences with teaching nature studies in the 5th class of basic school. She shows that this teaching subject is popular among pupils. The new botany textbook, in contrast to the previous one, provides a more integrated view of plants and proceeds from the individual and the simple to the complex and complicated. If work with the textbook is to be successful, this assumes a well stocked and equipped classroom. The biology teachers in the district of Senica participated in an open lesson carried out by the author and followed by a discussion on the experiences of teachers in working with the new textbook. This lesson is described in detail. It concerned the topic Inflorescence and the flower.

instruction + biology, basic school, 5th class, outcome + instruction, Czechoslovakia - 147315.

13.1 Testing of results achieved in biology instruction, repetitions, strengthening, systemization and structuralization of subject-matter, surveys of subject-matter

634. BELOKOPYTKOVA, Z.K.:
Aktivizatsiya uchashchikhsya v procese proverki znaniy
(The activation of pupils in the process of verifying their knowledge).
Biologiya v shkole, 56, 1982, No. 6, pp. 29-33.

The most important task at present is the increased activity of pupils in instruction. Each teaching lesson contributes to the learning of pupils and the time available should be made maximum use of, especially the time devoted to testing pupils knowledge: when one pupil is being questioned, what should the remaining pupils be doing ? The author discusses various methods of examining and testing pupils from this point of view and distinguishes 4 groups of operations used in testing pupils´ learning: 1) forms and methods of examining the pupil which lead to developing logical thinking and the drawing of conclusions and include drawing logical conclusions, filling in a missing link in a logical train of thought, making an outline based on logical thinking, correcting a logical error, finding a logical link between what had been learnt previously and now, 2) forms and methods of examining a pupil which develop his ability to find the main ideas or points of a problem and include making an outline of a correct answer, looking up new terms and notions thus learning them and clarifying them, 3) forms, methods and ways of examining which develop the pupil´s ability to do independent work with information sources, books, films, slides, pictures, etc. These can include the task of using supplementary reading for independent work, the use of material found in films, formulating a maximum number of questions based on a picture which illustrates the subject-matter being learnt and assignments in which physical and chemical laws must be used to clarify biological phenomena, 4) forms and methods of examining pupils so that their observation abilities (perception) are influenced; they can include for instance the playing of a "chain" game.

instruction + biology, testing of knowledge, examinations - 147315.

635. GLÄSSER, J.:
Zur Berücksichtigung der Einheit von Leistung und Verhalten bei der Ermittlung und Bewertung von Schülerleistungen (Taking into account the unity between performance and the behaviour of pupils in determining and assessing pupils´ performance)
Biologie in der Schule, 31, 1982, No. 11, pp. 457-461.
1 tab.

The purpose of the article is to show how the testing of the knowledge learnt should be conceived so that the teacher to an even greater extent penetrates the pupil's personality and is thus able to better influence him. The Marxist-Leninist approach to activities, according to which the personality develops through activities, provides an approach to dealing with this problem. The author describes how the teacher should proceed in the stage of preparing examinations, during the examination itself and in assessing the results achieved by the pupil. Theoretical postulates are illustrated by examples.

instruction + biology, outcome of teaching, GDR - 147315.

636. GÜNTHER, J.:
Die Kontrollaufgaben im Gesamtprozess der Bildung und Erziehung im Biologieunterricht (Examination assignments concerning the educational and teaching process in biology)
Biologie in der Schule, 31, 1982, No. 7/8, pp. 293-297.

The purpose of the assignments described here is to develop all aspects of the pupil's personality. In biology such testing assignments have various roles to play. They provide information about the quality of the pupil's knowledge and make it possible to give him a mark. Assignments can contain normative, informative and interrogative components, according to the demande they make upon the pupil - for instance the explanations of relations, facts, describing unknown phenomena, etc. Normative and informative components must be present in every assignment, while interrogative components are present only in those which require carrying out productive or creative activities. In planning the assignments, their solutions should be taken into account as

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well as their relation to the teaching syllabus - the author cites various examples.

instruction + biology, assessment of knowledge, assignment, pupil, Czechoslovakia - 147313.

637. HANSHAW, L.G.:
Test Anxiety, Self-Concept and the Test Performance of Students Paired for Testing and the Same Student Working Alone
Science Education, 66, 1982, No. 1, pp. 16-24. 5 tabs.

The author based his study on the hypothesis that students working in pairs have more opportunities to better deal with the assignment given in a written test, then when working alone in view of test anxiety and lack of confidence. The article described the outcome of an experimental project which is summed up into 5 tables. The assessment of the project indicates results in favour of team work (in pairs) even in written tests. In conclusion the author sums up his experiences into 4 recommendations for those teachers who would like to try this pair testing method.

assessment, written tests, team work, biology + instruction - 147315

638. HOSTE, R.:
What do Examination Items Test ? An Investigation of Construct Validity in a Biology Examination
Journal of Biological Education, 16, 1982, No. 1, pp. 51--58. 10 figs., 3 tabs.

The form and content of examinations have frequently been subject to criticism on the part of educators both from a formal point of view and for the small relevancy of their content. Here the author, on the basis of a written examination given to students in biology, attempts to assess students' knowledge as far as specialized terminology is concerned, general facts, special facts and a complex approach to the subject-matter. He uses drawings (for instance a vertical cross-section of the skin), as well as questions to determine students' knowledge. This form of examination is suitable especially for the upper grades of secondary school and is quite demanding for the teacher and his preparations.

instruction + biology, examinations, written tests, biological terminology - 147315.

639. ILIYEVA, R.:
Za dialetiko-materialisticheska nasochenost pri proverkata i otsenkata na znaniyata po biologiya (For a dialectical and materialistic trend in testing and assessing pupils´ knowledge in biology)
Biologiya i khimiya, 25, 1982, No. 3, pp. 47-51.

Party and government documents concerning the development and improvment of the educational system place greatest stress on the ideological education of young people in the course of school education. Fulfilling this task is impossible without forming a Marxist-Leninist opinion and the forming of the pupil´s own inner convictions, as well as his participation in the spiritual and material life of society. The author, on the basis of the example of some biology topics taught in the 6th and 7th classes, shows how the teacher can lead his pupils towards a dialectical and materialistic worldview. The proper formulation of various questions is very important since this helps the pupils to think logically and leads them to correct conclusions. The main purpose is to show the material unity of the world and its recognisability.

instruction + biology, results + instruction, Bulgaria - 147315.

640. KALINOVA, G.S.:
Obobshcheniye i povtoreniye znaniy o pokritosemennikh rasteniyakh (Summarizations and repetitions concerning angiosperms)
Biologiay v shkole, 56, 1982, No. 1, pp. 31-35. 2 tabs.

The author here discusses the subject-matter of angiosperms taught in the botany course in the 6th class. This subject-matter serves to recall the knowledge already taught in botany and continues in the development of knowledge concerning the structure, physiology and ecology of plants. The author then analyses in detail two lessons devoted to a repetition of what has been learnt. The first lesson deals with angiosperms as the plants which at present predominate and deals with their reproduction and relation to the environment. The second lesson deals with the influence of man's economic activities upon the specie structure of plants. The author also describes the specific organization of the teaching lesson and recommends the use of specific teaching aids and supplementary literature, such as for instance the documents of the XXVIth Congress of the Communist Party of the Soviet Union. For each lesson also suggestions for homework are offered.

instruction + biology, generalizations + knowledge, repetition, USSR - 147315.

641. KUKAN, Š. - SRNKOVÁ, M. - ŠEDIVÁ, K.:
Prieskum poznatkov žiakov základnej školy o mikroskope
(A study of the knowledge which basic school pupils have concerning the microscope)
Přírodní vědy ve škole, 33, 1981-1982, No. 4, pp. 122-125.
3 tabs.

One of the basic skills which biology instruction should form is the use of a microscope. Microscopy techniques are normally taught in basic schools, especially in practical excercises in biology, in laboratory work and in the work of hobby clubs. Microscopy makes instruction ostensive, leads to increasing pupils' interests and activity and hence to better learning. The team of authors carried out a study of pupils' skills and knowledge in microscopy at an urban basic school. The experimental group included 67 pupils (27 boys and 40 girls) from the 5th class and 78 pupils (28 boys and 40 girls) from the 7th class. There was one microscope available for every three pupils. It was found that two per pupil would be better, but three is still possible. It was also found that pupils' knowledge and skills are fairly good and that younger children are more interested in using a microscope than the older children. More attention should be devoted to the technical terms used and also to the more effective utilization of the time available.

instruction + biology, testing of knowledge, microscopy, practical excercises, Czechoslovakia - 147315.

642. PROKOFIYEV, M.:
O dopolnitelnych merach preodoleniya formalizma v otsenke rezultatov trenda uchiteley i uchashchikhsya
(On supplementary methods of overcoming formalism in the assessment of the results of work done by teachers and pupils)
Biologiya v shkole, 56, 1982, No. 1, pp. 4-5.

The 16th Congress of the Communist Party of the Soviet Union postulated the requirement that formalism be done away with in the work of both teachers and pupils. For this purpose creative pedagogical science should be made maximum use of, as well as developing the iniciative of teachers, using the best methods of work, an individual approach to pupils, improving the work of school principals, ridding school supervisors´ work of formalism and improving planning and paperwork. According to the Ministry of Education the most important negative aspect of schoolwork is a lack of knowledge concerning its weak spots; it also criticises the low quality of pupils´ knowledge, a superficial approach to the assessment of lessons and extra-curricula activities. It is also necessary to create a more healthy psychological atmosphere in schools and more effective cooperation with parents. Inspections and supervisory work should be improved.

instruction + biology, results + instruction, formalism, USSR - 147315.

643. SCHAEFER, G.:
Zur Schwierigkeit des Biologieunterrichts (Concerning some of the difficulties encountered in biology instruction)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 10, pp. 289-292. Lit. 3, 2 figs.

A number of years the question of why pupils more often chose biology as an elective subject rather than physics has been a subject of discussion. In the article the author attempts to define those teaching parameters which determine the difficulty or ease of individual natural sciences. He finds that on the basis of the most serious criteria biology should be harder than physics and physics easier than biology. This is especially true of the subjects' complexity and abstract structure of its terms and notions. On the basis of a pair of terms - exclusive and inclusive thinking - the author demonstrates that both these subjects are demanding and difficult. He uses the following criteria for making this conclusion: the requirement of precise logical thinking, the need to use abstractions, the need to use precisely defined and used terms, the need for objectivity, the need for honesty towards facts and reality.

instruction + biology, results + instruction, FRG -
- 147315.

644. SIPSON, M. - ARNOLD, B.:
Availability of Prerequisite Concepts for Learning Biology at Certificate Level
Journal of Biological Education, 16, 1982, No. 1, pp. 65-72, 7 tabs.

Photosynthesis, respiration, water regimen and heredity are all terms which are difficult for students to learn. It was found that only 18 % of college freshmen are able to provide satisfactory answers. In the authors' opinions students should first learn specific prerequisites before they are able to learn more complex terms and notions. Among these prerequisites are such terms as living organism, energy, gas, food. During excercises, students should be able to answer questions which show that they are able to correctly use basic terms, provide examples, qualify the term used whether it concerns living or nonliving organisms, etc. explain a specific classification and demonstrate the ability to define the characteristics of the term. Tables sum up findings concerning the outcome of tests done with students of various age groups. The conclusion the authors draw is the need to thoroughly acquaint pupils with basics in the natural sciences.

instruction + biology, secondary school, terminology - 147313.

645. VLKOVA, M.:
Poznavatelna samostoyatelnost na uchenitsite pri obobshchitelnite urotsi po biologia v deseti klas
(The cognitive independence of pupils in summary biology lessons in the 10th class)
Biologiya i khimiya, 25, 1982, No. 5, pp. 45-47, 3 tabs.

A lesson for summing up the subject-matter taught and making comparisons provides an opportunity to analyse and synthesize the subject-matter. The author suggests including such a lesson after the completion of the topic "The metabolism of organisms". First the pupils compare the differences and identical aspects of biological oxidation and burning. In the next lesson they compare the light and dark stages of photosynthesis and in conclusion they synthesize and generalise the knowledge they have attained concerning photosynthesis and respiration.

instruction + biology, repetition + subject-matter, secondary school, Bulgaria - 147313.

13.2 Assessment of results achieved in biology instruction

646. BRETSCHNEIDER, J.:
Wie ist es um die Sippenkenntnisse unserer Schüler bestellt ? (How do our pupils know plant and animal species ?)
Biologie in der Schule, 31, 1982, No. 9, pp. 353-355.

One of the tasks of biology teaching is to acquaint pupils with the great variety of living nature. In this an important role is played by a knowledge of plant and animal species; this knowledge also has a practical importance to it (for instance recognising protected species, poisonous plants, etc.). Biology in the 5th to 7th classes has a special role to play in this context. The author describes a project to study the extent of pupils' knowledge concerning species and the findings of the project.

instruction + biology, practical knowledge, recognition + plant, recognition + animal, 5th to 7th classes, basic school study project - 147313.

13.3 School-leaving examinations in biology

647. GOLLE, B.:
Zur Auswertung und Vorbereitung der schriftlichen Abschlussprüfung im Fach Biologie (Concerning the preparations for and assessment of written school-leaving examinations in biology)
Biologie in der Schule, 31, 1982, No.1, pp. 28-30.

An analysis of the written part of school-leaving examinations in biology for the school year 1979-1980 has indicated that besides successful work done, also a number of problems exist. 2101 essays were analysed grom 117 schools in different regions of the country. The author devotes special attention to those aspects of the work which were least positive, as well as those topics which pupils in the majority did not chose. Instructions concerning preparations for next year's examinations are provided in conclusions.

instruction + biology, school-leaving examination, written examination, GDR - 147315.

648. HOCKE, C.:
Zur Auswertung und Vorbereitung der schriftlichen Reifeprüfung (On the assessment of and preparations for written school-leaving examinations)
Biologie in der Schule, 31, 1982, No. 1, pp. 30-35.

The author first provides an assessment of written school-leaving examinations in the school year 1980-1981, based on an analysis of 202 essays by pupils in general education secondary schools. She analyses the outcome of the examination from the point of view of the pupils' knowledge and ability to clarify basic terms, processes and phenomena and from the point of view of carrying out observations and experiments. In conclusion instructions are provided for preparations for this examination in the school year 1981-1982.

instruction + biology, school-leaving examination, written examination, results of instruction, GDR - 147315.

649. MIKOLAJCZYK, W.:
Wyniki konkursu na prace maturalne (The outcome of a competition for school-leaving examinations)
Biologia w szkole, 35, 1982. No. 1, pp. 54-55.

In November 1981 the prises for the 6th annual competition organized by the Nature Conservation League were awarded. The competition was organized in cooperation with the Polish Ministry of Education. The topics concerned environmental control, the economic development of the region and the participation of young people in theoretical and practical conservation activities. 30 school-leaving examination essays were chosen for the final round of a nationwide competition in the 1980-1981 shool year. Of this number 12 received various prizes. 1st prize was awarded to Irene Budzie from Gdansk who wrote on the sensitivity of the lesser duckweed (Lemna minor) to waste water from the Gdansk Chemical Works which make phosphorous fertilizers and other chemicals. This prize was 5000 zlotys. The second prize (3000 Zl.) was awarded to K. Walewska for her work on the influence of detergents on the development of water algae. 3 third prizes (2000 Zl.) were awarded to three students.

instruction + biology, school-leaving examinations, written examinations, Poland - 147315.

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13.4 The outcome of biological competitions and the work of Young Pioneer Organizations in biology

650. LUTSKAYA, I.M.:
Budushchie khozyaeva zemli (The future masters of their country)
Biologiya v shkole, 56, 1982, No. 4, pp. 50-54.

There are 19 million members of the Young Pioneer Organization in the USSR. The article provides a survey of various activities which Young Pioneers take part in in various Union Republics. This was evident at the exhibition organized at the occasion of the 60th anniversary of the founding of the Soviet Union, the 60th anniversary of the founding of the Young Pioneer Organization and also as a greeting to the 19th Congress of the Komsomol (Comunist Youth Organization).

instruction + biology. Young Pioneer Organization, USSR - 147317.

651. TUPICHENKOV, S.V.:
Budushchie khozyaeva zemli (The future masters of their country)
Biologia v shkole, 56, 1982, No. 6, pp. 62-65.

At the occasion of the 60th anniversary of the founding of the Soviet Union and the 26th Congress of the Communist Party of the Soviet Union a Congress of the All-Union Young Pioneer Organization was held, which now has 6 million members in the 13- and 14-year-old group. At this Congress a plan of activities for the period 1982-1986 was adopted and a survey of Young Pioneer activities was given. The organization has had many successes in all the Union republics, where young nature lovers protect over 3 million hectars of forest (as members of forestry hobby clubs), in Moldavia they harvested 163 000 tons of vegetables and 49 000 tons of fruit, in Georia they harvested 23 000 tons of tea - the "green gold" of the country. In Kirgizia Young Pioneers take care of 35 000 heads of cattle, in Uzbekistan they have planted 6 million trees and shrubs. Also in the other Union republics, similar successes were reported.

instruction + biology, Young Pioneer Organization, Congress, USSR - 147317.

652. PANTALEEVA, M.:
Uspekhite na mladite agrobiolozi na XI pregled na TNTM
(The success achieved by young agro-biologists at the 11th festival of technical and scientific creativity of young people)
Biologiya i khimiya, 25, 1982, No. 2, pp. 53-55.

The supervisors of extracurricula activities in the area of agro-biology use various comprehensive and integrated approaches to organizing and implementing teaching combined with scientific research. Stress is placed on topics which contribute to the solution of new and current problems in biology, environmental control, microbiology, agriculture and the food processing industry. The organization of Young Agro-biologist hobby clubs, as well as conferences convened on some scientific topic have contributed to this work. Some interesting topics from this field have also been used in Biology Olympiads; the work of hobby clubs, which are assisted by the staff of the department of genetics at the Agricultural College at Plovdiv, have been very positively assessed.

instruction + biology, hobby club, assessment + work, USSR - 147317.

14. The biology teacher, outstanding biology teachers

653. BOGDANOVA, D.K.:
Shchedrost sertsa (Generosity of the heart)
Biologiy a shkole, 56, 1982, No. 6, pp. 53-54.

The article is devoted to the outstanding teacher Tamara Petrovna Tlisova, a biology teacher at the No. 7 secondary school in Nogrodovets. She has been at this school for 25 years, her lessons are always excellently prepared, she applies a differentiated approach to her pupils and seeks to combine theory and practical work (she has planted a cherry orchard with her pupils), her biology stockroom is full of various aids and teaching media, as well as a library and a living natura section of the biology classroom. Pupils from the school who are members of hobby clubs regularly visit the ornithological laboratory at Askaniya Nova. On a 2 hectar experimental plot of land belonging to the school she supervises the cultivation of trees and shrubs which are then replanted in urban areas. She has been awarded several times for her outstanding work. In 1981 she become a Teacher of Merit of the Ukranian Soviet Socialist Republic.

instruction + biology, biology teacher, award, USSR - 147305.

654. BIKOVA, N.L.:
V semye edinoy. Uchitelnitsa iz Polesyia (The example of a model teacher)
Biologiya v shkole, 56, 1982, No. 4, pp. 61-62. 1 photo.

The biology teacher at a rural school in Norinsk, E. Nikanorovna Shanyuk has been teaching for 30 years. She plants greenery with her pupils in the vicinity of the school and from among her pupils 25 have become biology teachers, 30 agricultural engineers, 40 physicians, 10 pharmacologists, 10 forestry engineers and 43 mechanics in agricultural operations. She is very successful in cultivating a love of nature in her pupils and supervises a nature conservation hobby club at her school. The pupils also cultivate decorative potted plants for the whole school. She cooperates with botanical gardens belonging to the Academy of Sciences, in various parts of the country. She has received The Order of the USSR for her excellent work.

instruction + biology, teacher + biology, award, USSR - 147305.

655. DZHORAEV, P.:
Khaytnazar Topaev
Biologiya v shkole, 56, 1982, No. 4, p. 49, 1 photo.

K. Topaev was first apprenticed as a blacksmith, after the war he became a biology teacher. He has been teaching for 34 years at the No. 20 secondary school in the Bitik-Chardzhonsk region of the Turkmenian SSR. The author describes his work and the excellent quality of his lessons, laboratory work and practical excercises done with his pupils. K. Topaev stresses pupils' independent work and the work done by the biology hobby club which he supervises. He is also the father of

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11 children, 5 of which have become teachers in their own right. In 1978 he was awarded the title Senior Teacher.

instruction + biology, teacher + biology, award, USSR - 147305.

656. GARINASHVILI, M.G.:
Esma Ivanovna Maziashvili
Biologiya v shkole, **56**, 1982, No. 4, p. 62, 1 photo.

Esma Ivanovna Maziashvili is a teacher in Tbilisi, the capital of the Georgian SSR. For her long-term service she has been awarded with the Order of Labour and has been named a Model Teacher of the nation's schools. She teaches at secondary school No. 140 where she uses the most modern teaching media, has an extensive living-nature section of the biology classroom and cultivates various greenery in the vicinity of the school together with her pupils. Her pupils have also planted greenery at a nearby kindergarten. Through the years her pupils have planted over 5000 trees of various species. She corresponds with various scientific institutions and universities.

instruction + biology, teacher + biology, award, USSR - 147305.

657. MOLIS, S.A.:
S polnoy otdachey sil (With all her energy)
Biologiya v shkole, **56**, 1982, No. 6, pp. 54-55.

Aldona Dominnikovna Milyuvena has been teaching at the eight-year basic school in Kirnyansk for 30 years. Besides teaching zoology, botany, human anatomy, physiology and hygiene she also teaches an elective course on nature conservation and works with her pupils on the school plot of land and in the school greenhouse. She has a very well stocked biology classroom and has organized a small nature conservation museum in the school. She also works with her pupils on the fields of the local Collective Farm and has achieved excellent results in vocational guidance. Her pupils regularly win at biology Olympiads and are active in nature conservation.

instruction + biology, teacher + biology, USSR - 147305.

658. NALBANDYAN, M.G.:
Uvlechennost plyus tvorchestvo (Enthusiasm and creativity)
Biologiya v shkole, 56, 1982, No. 6, pp. 55-56.

In the mining town Tkvarcheli, in secondary school No. 6, V.N. Kucherenko, who is a graduate of the Maykop Pedagogical Institute has been teaching for 7 years. His experiences are also made use of by the Abkhasian Institute for the Further Education of Teachers where he teaches. His work in school is highly successful: his biology stockroom has a large number of teaching aids and living natural objects, he regularly carries out observations and experiments with his pupils and his teaching lessons are excellent both from a didactical and scientific point of view.

instruction + biology, teacher + biology, award, USSR - 147305.

659: Pamyati Very Nikolayevny Fedorovoy (In memory of Vera Nikolayevna Fedorova)
Biologiya v shkole, 56, 1982, No. 4, p. 80.

On May 25, 1982 Vera Nikolayevna Fedorova, scientist, doctor of pedagogical sciences, professor and member of the Research Institute for the Content and Methods of Teaching of the Academy of Pedagogical Sciences of the USSR, died at the age of 74 years. For 58 years she worked relentlessly for the education of the young generation, for the training of new teachers and for the development of the pedagogical sciences. She began as an elementary school teacher and died as a scientist in the pedagogical sciences. The article describes her life and work. She was the author of many textbooks, including a methodology for botany (1973). She published a large number of scientific papers and headed a number of experimental projects in various schools.

teacher + biology, didactics of biology, USSR - 147305.

660. Shestidesyatiletiyu SSSR - tvorcheskiy trud uchitelya ! (At the occasion of the sixtieth anniversary of the founding of the USSR - the creative work of the teacher!)
Biologiya v shkole, 56, 1982, No. 6, pp. 3-7.

An editorial at the occasion of the 60th anniversary of the founding of the USSR which stresses the creative work done by Soviet teachers. The Central Committee of the Communist Party of the Soviet Union has at this occasion published a book which describes the social and economic progress of the nations of the USSR, the friendship which exists among these nations, the development of Soviet culture and of each citizen of the USSR. An essentially new system of education has been created in the USSR, education and the work of schools is linked to the policy of the Party, schools are acquiring a class characteristic and are fulfilling the tasks of a socialist society while at the same time contributing to its development. Schools combine teaching and practical work, instruction is combined with polytechnical education, education is provided to all, regardless of sex and nationality, every nation can chose the language in which instruction takes place and all privileges have been abolished. Russian has become a medium of understanding among nations. At the beginning of the XXth century in Czarist Russia 72 % of the people were unable to read and write, 50 nations had no written language of their own, four fifths of all children were educated only in basic schools, for every 1000 persons only 61 achieved higher than basic education and in rural areas only 3 out of every 1000 people had higher than basic education. A systematic network of schools did not exist. In the USSR, in the course of the 10th five-year plan, general secondary education has been introduced and in 1980 the USSR had 133 300 schools with 43.7 million pupils, 7378 apprentice training centres with 3.7 pupils and 4392 secondary specialized schools with 4.6 million pupils. Every year 2.5 million pupils graduate from secondary school and 1.3 million pupils from specialized secondary schools. In conclusion the article defines the tasks which await teachers in the next period.

instruction + biology, general education, USSR - 147305.

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661. USACHEVA, A.S.:
V seme edinoy (An excellent teacher)
Biologiya v shkole, *56*, 1982, No. 4, p. 48, 1 photo.

Gulov Khakim is a biology and chemistry teacher at rural school No. 33 in the Ordzhonikidzeabadsk region of the Tadzhik SSR who has achieved excellent results in his work. After graduation from the Pedagogical Institute 10 years ago he returned to his native village and became a teacher there. He has mastered modern methods and organizational forms of biological sciences and has a very positive approach to his pupils. He is also a good educator and helps his pupils to form a scientific worldview; he devotes attention to vocational guidance and educating his pupils towards work in agriculture. Under his supervision his pupils work in the local collective farm, cultivate fruits and vegetables, etc. Recently the school opened a new biology classroom with a well stocked study centre. He was also a delegate to the Congress of Teachers of the Tadzhik SSR.

teacher + biology, USSR - 147305.

14.2 Teacher training in normal, inservice and post-graduate study courses at pedagogical and natural science faculties

662. Ausschreibung der Spezialkurse für die Weiterbildung der Fachlehrer im Fach Biologie (Announcments concerning special courses for the further education of biology teachers)
Biologie in der Schule, 31, 1982, No. 9, pp. 377-382.

Course are organised according to instructions provided by the Ministry of Education for the period 1983-1987. For each of the courses mentioned, information is provided concerning its subject-matter, for which teachers it is planned, who is the organizer, where applications should be sent, the number of persons which can be accepted and the precises dates.

teacher + biology, further education of teachers, GDR - 147305.

663. JÄHRIG, E.:
Weiterbildung der Biologielehrer der Klassen 5 bis 10 in Kursen nach den neuen Programm ab Schuljahr 1982/83. (The further education of biology teachers for the 5th to 10th classes, according to a new teaching syllabus introduced in the school year 1982-1983)
Biologie in der Schule, 31, 1982, No. 6, pp. 250-252.

The author first assesses courses which took place in the period 1977 to 1982. She then analyses the new teaching syllabi for these courses of 30 hours each which will have three parts: 1) Human biology, 2) The relation between the organism and the environment, 3) The evolutiom of organisms. The courses include worldview aspects, scientific and didactical aspects, as well as gaining practical experience and participation in excursions. The article describes the subject-matter of the courses in detail.

teacher + biology, further education of teachers, GDR - 147305.

664. KWIATOWSKA, B. - KOWAL:
Pedagogiczny warsztat pracy nauczyciele biologii
(A pedagogical workshop for the work of biology teachers)
Biologia w szkole, 35, 1982, No. 2, pp. 78-81. Lit. 7.

The work of every teacher has two aspects: teaching specialized knowledge and the education of pupils. Study at a university and teacher training have so far provided for the first of these aspects, while educational aspects, we are sorry to say, are often overlooked among young teachers and it is here that the greatest number of negative aspects exist. Thus the need exists to improve the qualification of teachers. 33 % of teachers in Poland still do not have a degree from an institution of higher learning. In biology, teachers should acquire a broader knowledge of theory and practical aspects of using biological knowledge, as well as more extensive knowledge in the didactics of biology, the use of various teaching media and aids, on how to organize observations, experiments and excursions outdoors with pupils, etc. Teachers should also learn how to organize pupils' independent work, their preparation of papers which are given to the class, their work in hobby clubs on independent projects, etc. Also an individual approach to each pupils is the hallmark of a good teacher and this is something teachers should learn within their training.

teacher + biology, education, tasks + teaching, tasks + education - 147305.

665. MERTENS, T.J. - HENDRIX, J.R.:
Responsible Decision-making: A Tool for Developing Biological Literacy
The American Biology Teacher, 44, 1982, No. 3, pp. 148-152. 2 tabs.

The authors, who are college teachers, here offer their comments concerning teacher training in biology. A proper education should help the student to solve his own problems, to learn facts, as well as notions and theories. The authors discuss problems of nutrition, health care, increasing agricultural crops and population problems. They stress the practical aspects of biology which should be taught to pupils together with theoretical aspects.

teacher + biology, teacher training, USA - 147305.

666. SLÍPKA, M.:
Příprava studujících pedagogických fakult pro výuku přírodopisu (The training of students in teacher training faculties for teaching the natural sciences). Komenský, 106, 1981-1982, No. 1, pp. 29-31.

The purpose of teaching the natural sciences is to form in pupils a general notion of nature and to show them the relation and causes of the most widespread natural phenomena, as well as to show how man makes use of nature and changes it in the course of his work. According to the new concept of teaching, schools provide an integrated system of natural science subject-

-matter which serves the purpose of understanding living and non-living nature and their constant development. In other words the objective is to achieve an understanding of the world in its dialectical and materialistic essence, an understanding of man and his environment from a mental, as well as biological point of view. Activating methods of teaching which promote logical thinking, modern teaching media and organizational forms are especially stressed. The teacher should lead the pupil towards active independent work including work with natural objects, etc. A basic prerequisite for this is sufficient training on the part of the teacher, his scientific as well as didactical training. The author describes the curriculum at the Pedagogical Faculty in České Budějovice for students majoring in teacher training for the natural sciences. In the course of seminars, students become acquainted with all biology textbooks in use, with methodological handbooks, they analyse individual topics, deal with problems of chosing the correct teaching method, teaching medium and didactical principle. Students also learn to make individual preparations for a teaching lesson. Attention is devoted to verbal expositions and especially to experiments, demonstrations and the use of various technical media, such as films, slides, etc. The culmination of their training are practical teaching periods which are organized in the 1st and 4th year of study.

teacher + basic school, teacher training, natural sciences, Pedagogical Faculty - 147305.

667. ZICHÁČEK, V.:
Příkladná iniciativa (An iniciative which can serve as an example)
Přírodní vědy ve škole, 33, 1981-1982, No. 7, p. 258.

The Central Institute for the Education of Teaching Personnel in Prague has contributed to the forming of a new concept of biology and natural science instruction at general education schools. Its biology department regularly organizes discussions for the exchange of experiences and discussions with the authors of biological textbooks about new fields in biology, the experimental teaching of biology in general education secondary schools, the concept of post-graduate study for teachers at general education secondary schools, the preparation of new textbooks and other material, etc. The Institute also organizes courses for members of the Central Group of Lecturers, coordinates their activities with those of the Research Institute for Pegagogics and departments at various faculties. It also cooperates with specialists in the didactics of biology from these Faculties and organizes excursions for biology and nature science teachers. In conclusion the author provides information on a recent seminar organized by the Institute at Kostelec nad Černými lesy.

teacher + biology, teacher training, re-training, post-graduate study - 147305.

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14-21 Practical training by students of Pedagogical faculties

668. BIOSSER, P.E.:
Classroom Management - Pupil Control Ideologies Before and After Secondary School Science Student Teaching
Science Education, 65, 1981, No. 1, pp. 5-10, 3 tabs., lit. 14.

The opinions and ideas of education students on classroom management have an essential influence on their behaviour during periods when students undertake practical teaching. This study submits the findings of an empirical study designed to study this problem. The eight-week practical teaching period of education students majoring in the natural sciences was organised at 14 different secondary schools. The students' teaching was supervised and assessed by their lecturers from the faculty. 19 of the students filled in questionnaire before and after the teaching periods; the questionnaire concentrated on classroom management. The multiple choice answers were provided in scales of five; the answers to the 20 questions made it possible to divide the pupils into groups of according to their opinions on the need for authoritarian or free classroom management. Changes in attitudes before and after practical teaching are compared with other variables, such as the teaching subject, sex of teacher, etc. The conclusions are formulated in a tentative manner, in view of the small number of respondents in the study. However, the study indicated that practical experiences moved the opinions of the students away from the extreme of "free" towards more "authoritative" classroom management.

teacher + biology, teacher training, student teaching - 147305.

14.3 Public activities undertaken by teachers, work in district pedagogical societies, biology supervisors, visits to class by supervisors

669. ADELT, B.:
Unterricht und Weiterbildung als einheitlichen Prozess führen ! (Teaching and further education should be carried on as a unified process !)
Biologie in der Schule, 31, 1982, No. 5, pp. 204-207.

The great majority of teachers in the Neubrandenburg region regularly participate in various courses. Nevertheless, the content of the further education of teachers and according to what criteria should the effectiveness of such courses be measured are subjects well worth discussion. The author offers various comments on these problems and her own experiences in this area.

teacher + biology, further education, Pedagogical Institute, GDR - 147305.

670.
GEBAUER, I.:
Zur Arbeit mit der Direktive im Kreis Merseburg (Work with the directive in the Merseburg district)
Biologie in der Schule, 31, 1982, No. 2-3, p. 103.

Teachers strive to use the documents of the 10th Congress of the Socialist Unity Party of Germany also in the course of biology instruction. In the Merseburg

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district this problem is first discussed in a special committee where every member analyses a specific example. The members of the committee then teach model lessons, which the author describes.

teacher + biology, teaching staff, teaching lesson - 147305.

671. KOCHMANSKI, B.:
VII. ogolnopolska konferencja nauczycieli metodyków biologii oddziałow doskonalenia nauczycieli IKN
(The 8th All-Polish Conference of Teachers and Specialists in the Methodology of Biology organized by the department of teacher training of IKN)
Biologia w szkole, 35, 1982, No. 1, pp. 59-60.

On November 19th to 22nd 1981 the 7th All-Polish Conference of specialists in the didactics of biology met at Nowy Sasz. Among the problems discussed were lectures for biology teachers organized at the local level and some specific problems of the didactics of biology. Also a program of further activities was approved.

teacher + biology, methodology specialists, conference - 147305.

672. KOZLOVA, A. - FEDOREC, G.F.:
Rolyata rayonniya metodik pri izuchavane i obobshchavane na chelniya pedagogicheski opit (The role of district methodological specialist in the study and generalizations of educational research)
Biologiya i khimiya, 25, 1982, No. 2, pp. 18-24.

The success of the activities of specialists in methodology depends on the existing conditions and the systematic nature of their activities. It is important not only to describe the subject-matter of an experiment but also the conditions under which it was undertaken. Teachers of related subjects can come together for interesting discussions concerning didactics. The authors also discuss the nature science curriculum of general education secondary schools. They recommend organizing a card file which would deal with the interdisciplinary aspects of various topics and would be available at district centres for biology teaching methodologies.

teacher + biology, district specialist in methodology, interdisciplinary relations, methodological centre, Bulgaria - 147305.

673. Pamyati Anni Moyseyevni Tsuzmer (In memory of Anna Moyseyevna Tsuzmer)
Biologiya v shkole, 56, 1982, No. 1, p. 8o.

A.M. Tsuzmer died in November 1981 at the age of 73. For many years she worked as a specialist in the methodology of teaching biology at the Moscow Regional Institute for the Further Education of Teachers. She was the author of several biology textbooks, especially on human biology and frequently collaborated with the journal Biologiya v shkole. She recieved several awards for her selfless work. The article to commemorate her work was a written by a group of her collegues.

teacher + biology, didactics + biology, textbooks, USSR - 147305.

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674. VOLKOVA, Y.Y.:
Sistema nashey raboti po izucheniyu, obobshcheniyu i rasprostraneniyu peredovogo pedagogicheskogo opita
(Our system of dealing with the study, generalization and dissemination of the best educational experiences)
Biologiya v shkole, 56, 1982, No. 1, pp. 47-50.

The author is the chief of the study centre for biology at the Sverdlovsk Regional Institute for the Further Education of Teachers. She here describes the work of her study centre. Improving the qualification of teachers is one of the objectives set by the 26th Congress of the Communist Party of the Soviet Union. The study centre disseminates among other teachers the experiences of the best teachers in the region. The author also describes various forms of work done by the study centre, such as seminars and lectures for teachers and other activities.

teacher + biology, study centre + didactics of biology, further education of teachers, USSR - 147305.

14.6 Pedagogical readings

675. CELHAAR, K.H. - HORN, F.:
Pädagogische Lesungen 1982. Erfahrungen zur lebensverbundenen und erziehungswirksamen Gestaltung des Biologieunterrichts (Pedagogical readings in 1982. Experiences with the concept of biology instruction as an educationally effective process linked to practice).
Biologie in der Schule, 31, 1982, No. 11, pp. 449-454.

Every February pedagogical readings are held where biology teachers, other teachers and school administrators are able to exchange experiences. This year they were held for the ninteenth time. The authors describe the content of six selected pedagogical readings and cite some recommendations for future work in this area.

teacher + biology, pedagogical readings, GDR - 147305.

676. KYAGKOVA, A.N.:
Na Vsesoyuznikh pedagogicheskikh chteniyakh
(At an All-Union Pedagogical Reading)
Biologiya v shkole, 56, 1982, No. 4, pp. 33-39.

On April 13th to 16th the 6th All-Union Pedagogical Readings were held in Yerevan. The main topic was the improvement of teaching methods and the education of pupils in the light of the documents of the 26th Congress of the Communist Party of the Soviet Union. The vice-president of the Academy of Pedagogical Sciences, A.G. Khripkova, reported on the Congress deliberations and also the minister of education, M.A. Prokofyev, and the president of the Academy of Pedagogical Sciences of the USSR, M.I. Kondakov spoke. Stress was placed on the requirement of increasing the effectiveness of teaching methods and close organic links between teaching and education. As far as the didactics of biology are concerned 26 teachers from Armenia, White Russia, Kazakhstan, Kirgizia, Lithuania, the Russian Federation and Tashikistan presented papers in the form of pedagogical readings.

teacher + biology, pedagogical readings, USSR - 147305.

14.7 Meetings, conferences and congresses concerning biology

677. KLEINE, U.:
Zugang zur Natur. Ein Bericht über die 6. Europaratstudienkonferenz zum Thema Umwelterziehung (Report on the 6th European Council Conference concerning education towards environmental conservation).
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 12, pp. 447-451. Lit. 8, 3 figs.

On June 30th to July 5th 1980 in Wilhelmsoord in the Netherlands the 6th European Council Conference concerning environmental conservation was held. The conference was held at a sea-side resort with many sports opportunities and a number of tourists. The European Water Charter accepted in 1968 deals with the problem of water sports and the utilization of waters for recreation. In 1976 a European Charter was devoted to the problem of "Sports for All". Its authors recommend the drawing up of lists of damp places and standing waters which should .

be provided with the required amount of conservation, the registration of all motor boats and other means of transportation used in the water, conserving water fowl and drawing up a codex of behaviour for all protected areas. The attempt to attract tourists and visitors to resorts to participate in nature conservation activities should be assesed in a very positive manner.

environmental conservation, conference, water sports-
147305.

678. SVIREKSHCHIKOVA, Z.A.:
VI. plenum Uchabno metodicheskogo soveta (The 6th plenary session of the Science Methodology Council)
Biologiya v shkole, 56, 1982, No. 3, pp. 46-49.

The author describes the course of the 6th session of the Science Methodology Council of the Ministry of Education of the USSR. The meeting dealt with increasing the effectiveness of didactical work whose aim it is to teach pupils proper study habits and how to work independently. The author cites those who presented papers at the meeting and briefly describes their content.

Ministry of Education,meeting, study, independent work -
147305.

679. VIEBAHN, W.:
VIII. Kühlungsvorner Kolloquium "Darwin today" (The 8th Kühlungsborn colloquium on "Darwin today")
Biologie in der Schule, 31, 1982, No. 5, pp. 211-213.

The colloquium was organized at the occasion of the 100th anniversary of Darwin's death and was held on November 8th to 12th, 1982. Over 100 specialists from the socialist and capitalist countries participated, as

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well as the great-grandson of Charles Darwin, prof. Richard Darwin-Keynes. The author describes the main paper presented on "Darwin today" in some detail.

conference, Charles Darwin, Darwinism, GDR - 147305.

680. ZABEL, E. - HEINZEL, I.:
Ernst Haeckel - Schülerpreis 1982 (The Ernst Haeckel Prize for Pupils in 1982)
Biologie in der Schule, 31, 1982, No. 11, pp. 475-477. 1 fig.

In 1982 this prize was awarded for the 12th time. The prize is awarded by the Biological Society of the GDR and the Ministry of Education of the GDR for the best work in biology done by a pupil. This time three pupils were awarded; their work and its content are described in detail. Four others recieved honorary mention.

Ministry of Education, society + biology, work + by pupil, award - 147305.

681. GEHLHAAR, K.H.:
Wahlversammlung der Sektion Schulbiologie (A meeting of the Section on School Biology with elections was held)
Biologie in der Schule, 31, 1982, No. 11, pp. 477-478.

On May 8th 1982 in Mühlhausen a meeting of the Section for School Biology of the Biological Society of the GDR was held, where elections were carried out. The article assesses the activities of the section since its last election. Prof. E. Zabel was re-elected as president, prof. Baer and Dr. Brehme were elected as vice-presidents.

society + biology, meeting, elections, assessment + + work - 147305.

682. GÜNTHER, J.:
Vorinformation zu den XX. Schulbiologentagen (Preliminary information concerning the 20th Congress on School Biology in 1983)
Biologie in der Schule, 31, 1982, No. 10, pp. 437-438.

The main topic of the 20th Congress on School Biology will be "Determining and assessing the outcome of biology instruction". The Congress will be organized by the Section for School Biology of the Biological Society of the GDR, the F. Schiller University in Jena and the regional study centre for the further education of teachers and educators in Karl-Marx-Stadt. The author also describes the objectives of the Congress and provides organizational instructions.

society + biology, meeting, instruction + assessment, GDR - 147305.

683. KRÜGER, L. - TEUBNER, M.:
XIX. Schulbiologientagen vom 8. bis 11. Mai 1982 in Mühlhausen (29th Congress on School Biology from 8th to 11th May 1982 in Mühlhausen)
Biologie in der Schule, 31, 1982, No. 11, pp. 473-475.

Approximately 250 teachers,as well as specialists in the didactics of biology, participated in the Congress. The authors provide a brief survey of the papers presented, as well as the titles and speakers of the papers presented in the three sections which met at the congress.

society + biology, meeting, didactics of biology, GDR - 147305.

684. Kurzlehgänge der biologischen Gesellschaft der DDR Sektion Schulbiologie (Short courses organized by the Section for School Biology of the Biological Society of the GDR)
Biologie in der Schule, 31, 1982, No. 9, p. 383.

A course called "Current problems of health care policy and modern medicine as the basis for health care education carried out by biology teachers" will be held on February 14th to 18th 1982 in Dresden. A brief outline of the course is provided.

society + biology, health care education, course, GDR - 147305.

685. VOESACK, L.:
Information über die 8. Wissenschaftliche Jahrestagung der Biologiemethodiker der DDR (Infromation on the 8th annual scientific conference of specialists in the didactics of biology of the GDR)
Biologie in der Schule, 31, 1982, No. 5, pp. 210-211.

A two-day conference was devoted to the topic of "The five-year training of teachers - the challange and outlooks for the didactics of biology". The conference stressed four main tasks in the further education of biology teachers from the point of view of the didactics of biology. A paper presented by prof. Dietrich is also described in detail.

conference, didactics of biology, teacher training, GDR - 147305.

686. ZABEL, E. - SPEISS, E.:
Internationales Symposium zur Biologiemethodik
(An international symposium on the didactics of biology)
Biologie in der Schule, 31, 1982, No. 5, pp. 207-209.

A symposium called "On the subject of the didactics of biology and the further development of their theoretical foundation" was held in October 1980 in Greifswald (in the GDR). 61 specialists from 4 countries participated. The symposium concentrated on the didactics of biology, the theory of educational and teaching aims and determining the content and methodology of instruction. The article provides summaries of individual papers presented to the symposium.

scientific + gathering, didactics of biology, education + aims, teaching + aims, methods + instruction - 147305.

15. Articles with information on scientific biology

687. BOZAROV, V.C.:
Ot redkolegiata na spisanieto (From the editorial board of the journal)
Biologiya i khimiya, 25, 1982, No. 4, pp. 47-48.

On June 2nd, 1982 the editor in chief of the journal Biologiya i khimiya, comrade Vasil Khristov Bazarov, died. He was born on November 11th, 1907 into a large rural family. He graduated from the Teacher Training College in Botevgrad and then studied biology at the University of Sofia. He worked as a secondary school teacher, the principal of a general education secondary school, as the chief of a section at the

Bulgarian Ministry of Education and as teacher of the didactics of biology at the University in Sofia. He devoted 55 year of struggle for the social justice of the working class, against Fascist dictatorship and for a reform of the educational system in Bulgaria. He actively furthered Marxism-Leninism in the biological sciences and published a number of articles and textbooks. Until his death he was an active editor in chief who help all those requiring his help. He was highly respected for his straight_forwardness, humanity and erudition.

teacher + biology, didactics of biology, death, journal + didactics of biology, Bulgaria - 147305.

688. BRANDMÜLLER, J.:
Zum Symmetriebegriff und seiner Bedeutung für Naturwissenschaft und Kunst (On the term symmetry and its significance in the arts and in science)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 1, pp. 1-3. 10 figs., lit. 54.

The article discusses symmetry in various fields, among the natural sciences - biology, palaeontology, mineralogy, crystalography, as well as in painting, music and poetry. The author provides a number of illustrations concerning symmetry and asymmetry. He explains the terms general symmetry and 5 degrees of symmetry, as well as the problem of why symmetry is so important in a number of fields. Symmetry is defined as the spatial or temporal repetition of the same components. The author cites bilateral symmetry, the problem of the left and right side, reversed symmetry, the combination of reversed and mirror symmetry and translation symmetry. Symmetry in living and non-living nature is described and its existence and influence in the course of evolution on living and non-living nature. In conclusion the author discusses the didactical aspects of the problem and the fact that symmetry is very important in the study of the structure of matter and the laws of development of non-living nature.

symmetry, living nature, non-living nature - 147361.

689. DORNBERGER, K.:
Marine Naturstoffe - biologisch aktiv (Natural marine substances are biologically active)
Biologie in der Schule, 31, 1982, No. 9, pp. 391-394.
4 figs.

In seeking new biologically active substances scientists have been looking to the seas and marine organisms, which represent nine tenths of all living species. They have been shown to be a source of proteins, peptids, amines, novoamic acid, enzymes, derivates of nucleic acids, polysaccharides, organic compounds of bromium, fatty acids, organic acids, steroles, saponins, terpenoids, alkaloids, choline derivates and cyclical polysulphides. The author first discusses the substances found in marine micro-organisms and plankton (blue-green algae, diatoms, Bryzoa) and then deals with animals which can be the source of substance used in the pharmaceutical industry (corals, annelida, fish, cephalopods, etc.).

marine + organisms, organic coumpounds, microorganisms, plankton - 147317.

690. GERARDINI, A.C.:
Verifica (Verification)
Scuola e didattica, 26, 1980-1981, No. 18, pp. 75-76.

The author explains scientific procedures used to verify hypotheses which include the method of verifying an analogical situation, interdisciplinary approaches; and the use of a "discovery matrix" for determining in which teaching subjects a specific new discovery will make its impact - for instance problems connected with environmental survival, evolution, nutrition, etc.

science + methods, problems, hypothesis, interdisciplinary relations - 147361.

691. STEWART, J.:
Two Apects of Meaningful Problem Solving in Science
Science Education, 66, 1982, No. 5, pp. 731-748.
9 figs., 2 tabs.

The ability of students to solve scientific problems is becoming increasingly important in secondary schools. Teachers are often criticised for not devoting sufficient attention to this problem. The author here develops a model for solving a specific genetic problem (monohybrids and polyhybrids), where the problem is that alleles can be dominant or recessive; the signs of an individual are determined by these alleles. The model indicates how to proceed in finding a solution and making use of knowledge in genetics. Students should learn to theoretically explain what they are practically doing. The article is a valuable contribution to new teaching methods used in the upper classes of secondary school.

science, solution of problems, problem + genetics, secondary school, - 147363.

692. Biotechnology and Education

Journal of Biological Education, 16, 1982, No. 1, pp.10-12.

Biotechnologies represent the application of biological organisms, systems and processes in manufacturing and have strong implications for a number of industries. A team of educators has here prepared a report on the inclusion of topics on biotechnologies into the biology curriculum in secondary schools. The report also contains an essay on the forecasts for the growth of biotechnologies in the next thirty years. The purpose of the report is to gain recognition of biotechnologies as an important source of future welfare and to gain support for investments into this industry. Teaching biotechnologies should improve their general acceptance. The subject should also be taught in higher education.

instruction + biology, biotechnologies, secondary school, higher education, industry - 147367.

15.1 Botany

693. OEHRING, B.:

Die Problemgeschichte als Orientierungshilfe für die Didaktik. Beispiel Photosynthese. 2 Teil. (The history of a problem - an orientation aid for didactics: The example of photosynthesis - Part II).

Der Biologieunterricht, 18, 1982, No. 4, pp. 4-35.

The article continues in the subject matter of an earlier article published in this journal, 15, 1978, No. 4, pp. 8-9. It provides information on new discoveries and the correct, as well as incorrect or incomplete interpretation of various topics on photosynthesis. Expositions using the historical approach, which is used in the article, provide students with a survey of the problems and lead them to the gradual understanding of this most complex biological process taking place on Earth. The work of the following scientists is described: Nicolas de Saussure (1767-1845) on the balance of matter in plants, Julius Sachs (1832-1897) on chlorophyll and photosynthesis, Wilhelm Pfeffer (1845-1920) on the metabolism of plants, as well as C. L. Treviranus (1779-1864), F.J.F. Meyen (1804-1840), J.M. Schleiden (1804-1881), J. v. Liebig (1803-1873) and Robert Mayer (1814-1878). The article very well demonstrates the effectiveness of the historical method in biology.

botany, instruction + biology, photosynthesis, historical method - 147355.

694. PAGLIARI, M.:
Il problema delle riserse alimetari II. (Problems of nutritional resources - II).
Scuola e didattica, 26, 1980-1981. No. 8, pp. 57-58.

The food crisis of the seventies can be further developed as a teaching subject by describing the problems leading to famine and other catastrophes up to the present (for instance Biafra in 1969, Bangladesh in 1972, Africa south of the Sahara since 1974, etc.). In conclusion of the whole topic a discussion on the increase in food resources for the world can be organized. Specifically this concerns increases in fertile soil by improving the quality of uncultivated soil, improving the fertility of the soil, preventing crop losses, etc.

agriculture, production + food, soil - 147367.

695. ZIEGLER, H.:

Pflanze und Wasser (Plants and water)

Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 4, pp. 232-237. 1 tab., 6 figs.

There are two basic types of plants as far as their utilization of water is concerned: poikilohydrous and homoiohydrous plants. Each has its own specific aspects in water intake and its transportation, output and storage. All plants require a steady input of water for active life and the transition of a plant to a period of incativation (seeds, spores) is always connected with a lack of water. The fruit of the tomato has 94 % water, a potato tuber 78 %, freshly cut wood 50 %, but the seeds of maize only 10 %. In an active state plants need water to create a reactive environment as a transportation environment, as a cooling system and in some plants as a building material. Only plants strengthened by turgor can wilt, but not plants with a firm skeleton (trees, etc.) or animals with a skeleton. The Rhynia was the first terrestrial plant. It still has small leaves, but it did not have roots, only transport ducts for water, cuticule and stomata. Rhyniophyta already had a stabilized water balance. Ferns and seed plants have stages which are capable of dehydration, sometime even the leaves can be dried. However, the roots can never become dry without dying. The author also deals in detail with the development of stomata is plants during phylogeny. It is interesting to note that from the point of view of phylogeny, stomata are older than leaves - they can be found already on the stem of Rhyniophyta.

botany, physiology + plants, water + input, warwe + output, phylogeny - 147355.

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15.2 Zoology

696. ALTMANN, A.:
Nález fosilie největšího dravce (A fossil finding of the largest predator)
Přírodní vědy ve škole, 33, 1981-1982, No. 10, p. 369.

In Argentina the skeleton of a huge flying predator has been found called Argentavis magnificiens, which lived 5 to 6 million years ago in South America. A reconstruction of the animal indicates that it was 3.4 meters long from the tip of its beak to its tail, and it has a wing span of 7 meters. It belonged to the order of birds of prey, the suborder Condors, family Cathartidae. The condors are the oldest family of birds of prey. In the early Tertiary era they also lived in Europe. In spite of the fact that their weight is estimated at 75 kilograms its seems that this bird was an excellent flier.

zoology, birds, fossils - 147357.

697. DUNK, K. van den.:
Mimese und Mimikry - vielseitige Tarnungen der Insekten
(Mimetics and mimicry - comprehensive ways of defensive colouring in insects)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 5, pp. 144-154. 5 figs., 3 models for transparencies.

In the course of evolution insects have developed various ways of protecting themselves against their enemies. The comprehensive nature of their mimicry is here described on the basis of numerous examples. The author describes the imitation of body shape of various objects (branches and twigs, the feces of birds, leaves and flowers), attacking mimicry, etc. The evolution of these phenomena is described and their importance for the survival of insects.

zoology, insects, biological combat, mimicry - 147357.

698. MAMAYEVA, K.P.:
Galli i ikh isposovaniye (Galls and their use)
Biologiya v shkole, 56, 1982, No. 4, p. 20.

Galls are tumor-like extrusions found on various organs of plants and trees. They develop as a reaction to irritation caused by the larvae of some insects. On oaks the gall is caused by the gall wasp. Galls are sometimes used for medicinal purposes because they contain alkaloids and tannin. Their extract is used in dyeing. Some important plant and forest pests are also causes of galls and combating the forming of these galls requires a detailed knowledge of insect life.

zoology, insects, plants + pests - 147357.

699. PATLYAKECICH, N.D.:
Ekholokatsiya u rukokrilikh (Echolocation in bats)
Biologiya v shkole, 56, 1982, No. 3, pp. 20-26. 6 figs.

The author deals with the order of Chiroptera which includes a large number of species. He first describes some of their taxonomic aspects and then deals in detail with echolocation. This phenomenon was discovered in living nature about 40 years ago. But already in 1793 L. Spalanzani showed that bats find their way in space with the aid of their hearing. In 1920 a British neurophysiologist formulated the hypothesis that bats in flight produce short wave sounds. This hypothesis was confired only in 1937 when a sound detector was constructed by the American scientist Griffin.

Representatives of the order Chiroptera, suborder Megachiroptera, with the exception of three species, have sight orientation, while representatives of the suborder Microchiroptera have orientation based on echolocation. The sound signals differ in different species. Fish-eating and insectivorous bats produce the most intensive sounds. The author describes the frequency of the signals of various species in detail and in conclusion describes the use of echolocation in bionics.

zoology, mammals, Chiroptera, echolocation - 147357.

700. PRESTWICH, G.D.:
Termite Soldiers - Warriors with Chemical Weapons
The Science Teacher, 49, 1982, No. 3, pp. 50-53, 5 figs.

Termites belong to the more primitive insects. But they live in a complicated social system which is much more developed than that of bees, wasps and other social insects. The author describes in detail the social organisation of a termite colony and especially describes their warriors whose "weapons" are chemical; they use their chemical excrements in combat with enemies, for instance ants. The excrements are used in biting and also for spraying the enemy, which paralyses it. The author analyses the composition of these excrements.

zoology, insects, social behaviour, poison + animal - 147357.

701. LINDAUER, M.:
Lernen, Gedächtnis, Vergessen, Beiträge aus Untersuchungen mit Bienen (Learning, recall and forgetting. Findings from a study of bees)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 5, pp. 129-138.

A successful educational and teaching processes has three stages. The selection of suitable signs and associations with an important experience and specific environment (coding, conditioning), the accumulation of these "learning units" as memory in specific structures of the central nervous system and "reading out" on the basis of recall when specific situation requires it. Signs are not found in the memory in isolation but are always accumulated in the memory of an individual as a combined system. Adaptability is an essential characteristic of life; the ability of the organism to adjust to changing conditions in the environment takes place in two ways - by long-term new combinations and by mutations in the hereditary base which changes slowly, on the basis of many rapidly changing characteristics. Learning can be defined as a change in behaviour as far as improved adaptability to the environment is concerned, based on subjective experiences. In active learning various stages can be distinguished, such as receiving information through coding and conditioning and the storage and accumulation of information (sensory recall, long-term and short-term recall). The sensory stage can be demonstrated on the basis of experiments with the crayfish Procamburus and short-term recall in experiments with bees. A number of drugs exist which improve memory (amphetamine, coffein, nicotine, pikrotoxin, diisopropyl-fluorphosphate etc.). For improving long-term recall drugs for improving the performance of the memory can be used, such as puromysin or cycloheximid. A study concerning the reception of information in bees on the basis of a screening process is very interesting. Bees have a hierarchy of preference for different colours, they remember purple the fastest, then blue-green, blue, yellow and orange.

zoology, insects, bee-keeping, memory, forgetting, learning, experiments - 147357.

702. SCHNEIDER, D.:
Pheromone von Insekten (Insect pheromones)
Praxis der Naturwissenschaften - Biologie, 31, 1982,
No. 5, pp. 138-144. Lit. 12. 7 figs.

Communication among insects with chemical signals has been a subject of intensive study. Especially various features of the transmitter - receiver model are of interest. The males of butterflies and moths produce aphrodasiacs which cause the female to allow copulation. The Monarch butterfly of the Danaidae family has clusters of hairs which produce a smell and particles of this smell are dropped by the male on the olfactory sensors of the female. But before the Monarch males can produce the pheromones they must visit specific plants which produce the precursors of the signalisation substance. The sensory organs for pheromons are the olfactory cells found on the butterflies' antennae. The functioning of the organs has been more closely studied in moths. The problem of inactivating the pheromones is not yet clear. We do not know what happens to the signal molecules one they have activated the relevant receptors.

zoology, insects, butterflies, pheromones - 147357.

15.3 Human biology

703. SCHÖNE, J.:
Zur Physiologie der Muskelbewegung (On the physiology of muscle movement)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 6, pp. 175-178. Lit. 2. 2 tabs.

The author describes the work of muscles based on the fact that some molecules are capable of freeing the energy they have accumulated. These molecules are in the majority of cases made of chains or fibres, which allow them to tranform accumulated energy into mechanical work. The author also describes the function of ATP in the work of muscles, during which polymers develop out of monomers and then monomers again out of the polymers.

human biology, muscle system, physiology, energy metabolism - 147359.

15.4 General biology, genetics, macro-molecular biology, bio-chemistry, bio-physics, bionics

704. ALTMANN, A.:
Buněčná fysiologie immunologické odpovědi (The cellular physiology of immunological response)
Přírodní vědy ve škole, 33, 1982, No. 4, p. 135.

In the course of evolution vertebrates have developed special defensive systems which destroy antigenes in the body through lymphocytes. Lymphocytes A and T should be distinguished. Allergic reactions of

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the organism are of the humoral type (for instance asthma, hay fever, rash and anaphylactic shock). A breakdown of the immunological defensive system can lead to a number of diseases, to auto-immunoaggression which is the cause of rheumatism and Hashimota's disease where the thyroid gland withers away, etc.

human biology, immunology, disease + blood - 147359.

705. BAUMANN, K.:
Wachstum und Entwicklung (Growth and development)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 3, pp. 90-94.

The article contains a report on the 11th meeting of the Society of German Natural Scientists and Physicians which was held in the autumn in Hamburg. The program of the meeting had uniquely biological and medical topics. Prof. Schulz spoke on the differentiation of proteins, prof. Kuhn on molecular self-organisation and the development of life, prof. Grundmann spoke on the cell cycle, prof. Schaller spoke about morphogenic substances in the Hydra and prof. Dreus on the determination of sex and sexual differences.

zoology, general biology, medicine + science, meeting, FRS - 147359.

706. BOHEIM, G.:
Über die Grenzen der Zelle (Over the border of the cell)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 4, pp. 112-117. Lit. 12, 6 figs.

The author describes modern methods of studying cell membranes and some of the findings these studies have arrived at. He explains the permeability of the membrane for various kinds of ions (Na, K) and methods for measuring this permeability. He describes a method called black lipid film and its function and modern alternatives. As an example one pore in a membrane is examined in detail, as well as one biological macro-molecule (an acetylcholin receptor). On the basis of a number of findings the author demonstrates that a study of membranes opens new paths of learning on the openning and closing of ion canals in membranes.

general biology, macromolecular biology, cellular membrane - 147361.

707. BRYANT, C.:
Biochemical Adaptation in Helminth and Protozoan Parasites
Journal of Biological Education, 15, 1981, No. 4, pp. 254-258. 2 figs.

The biochemical adaptability of parasites is evident at all levels of organization of living matter. But the process itself by which this occurs is not yet understood. The author explains the problem of parasites, their migration in the body of the host and their metabolic adaptability. He also describes in detail the oxidation of carbohydrates caused by parasites in the bodies of mammals, specifically sheep and the Fasciola, Ascaris, Moniezia and Plasmodium parasites, whose adaptability is especially great. Parasitic adaptation is not passive and does not decrease genetic capacity. It represents more a gradual dynamic process which maximalizes biological abilities and minimalizes energy losses in the parasite population and often leads to a broadly based biochemical strategy for the specie.

general biology, parasites, adaptation + animal - 147361.

708. HINDER, A.W.:
Biological Reduction-oxidation Reactions
The School Science Review, 64, 1982, No. 227, pp. 275-277. 3 figs., 1 tab.

To understand oxidation-reduction processes in biochemistry is very important. The author explains when biological oxidation can take place and in detail explains the whole process on the basis of individual examples which are supplemented with chemical equations on energy changes, the transfer of Nitrogen electrons during respiration and the transfer of electrons in photosynthesis. A table shows the reduction potentials of some electron tranfers during reduction. The explanations are addressed to the pupils of the second class of secondary school.

biochemistry, secondary school - 147361.

709. HORNÍK, P.:
Biologický účinek rychlých neutronů (The biological effect of fast neutrons)
Přírodní vědy ve škole, 33, 1981-1982, No. 4, pp. 134, lit. 2.

In man's environment radiation is constantly present; most of it is electromagnetic radiation (light which can be seen, X-rays and gamma radiation). The biological effect of various electrical ions of differing energy and weight is now a subject of study, especially the effect of electrically neutral neutrons. In the transmission of energy by radiation the ionisation of atoms or molecules occurs which is the beginning of damaging tissue. The author describes the biological effect of neutrons on biological material. After radiation, cells regenerate only to a very small extent or not at all. This fact is made use of in the treatment of tumors which also contain areas insufficiently supplied with oxygen and sensitive to neutrons, just as cells which live in anoxic or even oxic conditions. This is the reason why radiation can be used for the treatment of tumors. Fast neutrons have an increased mutagenic effect. Hence the neutron bomb would lead to permanent damage even with a low level of radiation.

general biology, bio-physics, radiation - 147361.

710. KOSSACKA, W.:

Znaczanie genetyki w psychologii i pedagogice

(The significance of genetics in psychology and pedagogy)

Biologia w szkole, 35, 1982, No. 3, pp. 170-173. Lit.5.

The relation between genetics on the one hand and psychology and pedagogy on the other has not been a subject of systematic study. The most important question is which signs in a person are hereditary and which are not. Every sign transmitted through genes is hereditary, not only the colour of the eyes, but also the function of individual organs. A signal mutation can cause a whole chain of biochemical changes, for instance the hereditary disease phenylketonuria. Information on the hereditary characteristics of man are still incomplete. A good memory is not hereditary, as well as musical talent. Inborn intelligence is hereditary and means the ability to correctly assess a situation and select a behavioural pattern and hence the acquisition of an objective under changing conditions. A number of abilities and some aspects of temperament are also hereditary,as well as the ability to learn. Only a genetic program is inherited, its actual development and implementation takes place in the course of a whole life and under different conditions. A genotype determines the opportunities for mental development, but the environment, including the family, school and society, decides how it will be actually developed. A genotype also provides a wide range for adaptation: this increases the importance of the educator and teacher. Human personalities change under the influence of a genetic program, as well as the influence of society (the influence of the environment and education), and the person's own program (motivation).If this combined program is not in harmony with the genetic program then the child is threatened with nervous disorders or faulty social communication. Hence the teacher should know the abilities and interests, temperament and weak aspects of his pupils; education should be adapted to the intellect and strivings of the pupil. The performance of a pupil should be assessed very carefully, and pupils interests taken seriously; work done without motivation and the relevant abilities and skills can become a source of frustration, stress and even lead to nervous disease. Active and aggressive pupils are good organizers, sportsmen and youth leaders. But we should be aware of the fact that most people are not clear-cut types. Each person has a stock of potential genetic signs, which we never know when they will suddenly make their appearance. A knowledge of genetics, together with knowledge in psychology makes the work of the teacher easier.

genetics, general biology, psychology, pedagogy, interdisciplinary relations - 147363.

711. KUBIŠTA, V.:
Bioenergetika II - Fotosyntéza (Bioenergy II. - Photosynthesis)
Přírodní vědy ve škole, 33, 1981-1982, No. 8, pp. 282-284. 3 figs., 2 lit.

The article cites the most important facts about photosynthesis and points out that if interdisciplinary relations are to be respected then a simplified but logically correct model of bioenergy metabolism processes should be taught. Within the framework of the existing teaching syllabus the scope for the utilization of such a model are very small, but on the basis of the project for a new syllabus these opportunities will be greatly extended. On the basis of experiences gained with students in the 1st year course of the Faculty of Natural Sciences at the Charles University in Prague when teaching an introduction to biology, the author criticizes the insufficient teaching of biology in general education secondary schools and points out that many facts are taught, but no stress is placed on their mutual relations so that all the students' knowledge is accumulated at a single level and easily forgotten - not only details, but basic knowledge. On the basis of the example of bio-energy the author demonstrates how one item of knowledge should be derived from another and the inner logic of living processes stressed. Basic facts concerning photosynthesis are integrated into a broader context (respiration, fermentation, the characteristics these processes have in common with photosynthesis, physical and chemical laws of energy transformation which takes place in photosynthesis). The primary importance of photosynthesis is stressed for existing life on Earth, as well as photosynthesis from the point of view of evolution, its contrast to respiration, the light stage of photosynthesis, cyclical phosphorylation, the photolysis of water and the dark stage of photosynthesis. Also the mechanism of photosynthesis and catabolic phenomena (such as respiration and fermentation), which have their basis in the oxidation-reduction process and their movement of electrons between systems with differing redox potentials are described. ATP is synthesized during photosynthesis and respiration by making use of membrane potentials which are the outcome of the transmission of H^+ ions through a membrane. Fermentation is not, however, directly dependent on the membrane. During fermentation the aldehyde group is dehydrogenised to a carboxyl group, while during photosynthesis the carboxyl group is reduced to the aldehyde group. In fermentation, carbon dioxide is bound to the carboxyl reaction.

general biology, macromolecular biology, photosynthesis - 147371.

712. KÖPPL, R.:
Wahrscheinlichkeitsrechnung in der Genetik (Probability calculus in genetics)
Der Biologieunterricht, 18, 1982, No. 3, pp. 42-80.
Lit. 20, 18 figs., 4 tabs.

Mathematical methods are regularly used in the intermediate and upper classes of secondary school in physics instruction. But they can also be used in biology in specific fields. The first attempt to use mathematics (probability calculus) dates back to the 14th century when Leonardo di Pisa Fibonacci mathematically expressed the multiplication of rabbits. But it was only in the 19th century that mathematical models and probability calculus began to be used in biology more extensively, at first in developing Mendel's laws of heredity. A prerequisite for the use of mathematics in biology is basic mathematical knowledge on the part of pupils. The author provides an introduction to the problem and to basic notion of probability calculus based on the rules of multiplication and addition in multi-stage experiments concerning radom processes. On the basis of specific examples (from a genetic counselling service) the author demonstrates the use of probability calculus in biology. The reader is also acquainted with the Hardy-Weinberger law and its use in studying selection and the proof of Hardy-Weinberg~~er~~ equilibrium in natural populations.

genetics, probability theory, model + probability, Hardy-Weinberger law - 147363.

713. OTTO, M.K.:

Anfänge der Ahrnehmung (The beginning of perception) Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 4, pp. 106-112. Lit. 4, 12 figs.

During the last 20 years of his life Delbrück devoted his attention to the problem of the perception of a unicellular fungi called Phycomyces. Its physiology of perception is so interesting and surprising, that Delbrück considered it as important as phages have been for modern genetics. The author here describes the perception of this organism and its reaction to changes in the environment which lead to changes in its behaviour. Phycomycetes is a unicellular fungus whose spore carrier is several centimeters long and thin as a hair. The carrier grows very quickly (3 mm per hour), so that its growth can be observed through the microscope. The growth zone of the carrier is also the site of perception; it is a combination of eye, nose, perception of growth and gravity, the brain and muscles of the whole unicellular organism. The spore carrier reacts to various sources of irritation. It has negative geotropism, is capable of orientation against Earth's gravity, it is able to discern obstacles which it bypasses, it reacts to light, is positively phototropic and this latter reaction serves the process of reproduction of the fungus. The range of phototropism of the fungus is very large, from the intensity of light provided by a starlit sky, up to the billion time greater intensity of light produced by direct sunlight. The protoreceptor of Phycomycetes is capable of as much as the human eye. Experiments have shown the presence of riboflavin as a photopigment, as well as roseoflavin. Carotenes are not present in Phycomycetes as pigment.

general biology, physiology, fungi, perception - 147361.

714. OXLADE, E.L.:
A Short-cut with Drosophila
The School Science Review, 64, 1982, No. 227, pp. 257-277.

Drosophila melanogaster or the fruit fly is the best object for the study of genetics. Its breeding and cross-breeding has been described in detail many times over. The difficulty in experiments with the fly is in determining the sex of an individual fly, Screening out females which have not been fertilized, applying anesthesia to the flys without killing them and classifying them when they are asleep. The author describes these procedures on the basis of his own experiences and provides various hints on how to carry out these tasks by students so that they achieve the desired results and complete successfully the experiments.

genetics, insects, experiments, laboratory technique - 147363.

715. SCHEER, H.:
Phytochrom - Molekulare Eigenschaften eines pflanslichen Licht Sinnespigments (Phytochrom - the molecular properties of a light perception pigment)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 3, pp. 82-90. Lit. 5, 5 figs., 3 tabs.

Photochrom is one of the pigments which provides plants with light perception which has so far has been studied most extensively. It influences a number of development and movement processes controlled by light in plants. The author sums up information on the molecular properties of photochrom and the techniques used to study it. He also explains in detail the physiological reactions influenced by phytochrom which are found in plants only in tracer quantities and can be identified only by spectroscopy. Structurally it is a chromoprotein and it influences changes in electrical potential, the adhesion of roots, the permeability of membranes, the synthesis of hormones and a number of other processes which occur in the plant.
biochemistry, assimilation, plant physiology - 147371.

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716. SCHILLING, N. - DENK, D.:
Das häufigste Protein der Welt (The most abundant protein in the world)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 3, pp. 74-82. Lit. 16, 6 figs., 3 tabs.

The biochemical study of proteins in the green leaves of plants led Wildman and Bonner in 1947 to discover the high concentration and large molecular weight of some proteins. The authors call one such substance fraction I protein or FIP; it is found in large concentrations in chloroplasts; it catalyses one of the decisive processes occuring in nature - i.e. the binding of CO_2 in organic coumpounds. However, the discovery of the above mentioned scientists was very surprising because they proved that the protein is at the same time active in relation to oxygen and acts as ribulosie-1.5-biophosphate-oxygenasie. This latter activity leads to a decrease in the production of matter. It has also been shown that two gaseous substances (CO_2 and O_2) compete for FIP. The authors also describe how FIP is obtained and purified in the laboratory. The case of a single enzyme with an equally active centre for two different reactions which are catalysed by two different methods of gas metabolism is unique.

biochemistry, macromolecular biology, proteins, enzymes - 147371.

717. SCHMIDT, V.:
Grundlagen der "Genetischen Manipulation" (The foundations of genetic "manipulation")
Biologie in der Schule, 31, 1982, No. 6, pp. 256-264. 5 figs.

The dangers and opportunities provided by genetic manipulation is a subject of frequent discussion. Genetic engineering can be understood in various ways and often is limited to the manipulation of genetic information at the molecular level (DNA). The term can, however, be broadened and defined in the following way: "Genetic manipulation means carrying out conscious changes in the genotype composition of individuals or whole populations". From this definition three different levels of genetic manipulation can be derived: shifts in the frequency of genes in populations or their multiplication in the course of sexual reproduction, the cross-breeding of remote species (the transmission of part of a genome) and finally genetic changes of cells on the basis of the reception of isolated or transmitor-bound DNA (genetic manipulation in the narrow sense of the word). All three aspects are described in detail.

biochemistry, macromolecular biology, genetics, genetic information + manipulation - 147363.

718. SCHWAB, M.:
Gentechnologie - Bakterien als Produzenten euraryotischer Proteine (Gene technologies - bacteria as producers of eucaryonta proteins)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 5, pp. 260-268. 11 figs.

In 1970 scientists were successful in carrying out the covalent combination of eucaryotic and procaryotic DNA in vitro. Since then the in vitro recombination of DNA of different origins has been technologically refined and it is now possible to isolate caryotic genes and insert them into autonomously replicated elements and thus create holocephala, to replace recomined DNA in bacteria and make the eucarotic gene function in them. The purpose of this very complex pioneering work, besides the purely scientific aspects of the problem, is to carry out an industrial synthesis and to produce pharmaceutically usable products such as for instance insulin, which regulates sugar in the blood, or interferon which is used in cancer therapy. In spite of the fact that the latter objective has not yet been fully implemented, this new discipline is now rapidly developing and will lead to a better understanding of the molecular structure of genes and the regulation of their activities; in the course of several years huge advances have been made. The author describes in detail the molecular foundation of gene technologies, cloning, the structure of procaryotic and eucaryotic genes, the detailed structure of genes (coded sequences - exons and uncoded sequences - interons). It has been found that bacteria are unable to breakdown eucaryotic m-RNA. How DNA genes are obtained is described,as well as the expression of eucaryotic cells in bacteria. Gene technology has already developed a whole series of modern methods such as the use of monocolonal antiparticles. The fact that so far experiments with DNA recombination have not been connected with any danger is very important. This work has provided us with extensive insights into the molecular mechanism of heredity.

macromolecular biology, genetics, genetic information + manipulation - 147363.

719. TRIBE, M.:
Mitochondrial Mysteries.
Journal of Biological Education, 15, 1982, No. 4,
pp. 249-253. 3 figs.

A cell is not a homogenous unit, it contains various subcellular particles including the nucleus and others. Mitochondria and microstomata are most important for the metabolism of the cell. The author acquaints readers with the latest findings in mitochondrial research and in the article concentrates on the transportation of electrons and the ATP synthesis mechanism. In the second part of the article he deals with the mitochondrial genetic system from the point of view of most recent findings. The fact that research in this area is continuing and will bring new findings is stressed.

molecular biology, cell, mitochondria - 147361.

720. VLACHOV, S.:
Perspektivy za razvitie na promislenata mikrobiologiya
(The outlooks for developing the microbiological industry)
Biologiya i khimiya, 25, 1982, No. 2, pp. 8-13.

In the 21st century a great flourishing of the biological sciences can be expected. New discoveries are also expected in molecular biology and industrial microbiology. One of the most important research objectives in microbiology are methods for using various microorganisms for the production of proteins. At present 4 types of microorganisms are being considered for this purpose - yeast, bacteria, fungi and microscopic algae. Specific sugars and alcohols are being tested as the primary raw material for protein synthesis. Another very promising area is the biosynthesis of microbial enzymes for use in the pharmaceutical production of antibiotics. The development of the relevant industrial technologies will play an extremely important role in the development of contemporary biology.

microbiology, molecular biology - 147361.

721. WARR, J.R.:
The Use of Cell Cultures in Human Genetics

Journal of Biological Education, 16, 1982, No. 1, pp. 22-26. 3 figs.

A professor of genetics at the University of York here considers the parasexual cycle in mammal cell cultures, on the basis of which genetic analyses can be carried out, based on most recent findings in genetics research. The author discusses hybridization as the production of a large number of pure clones, genetic analysis, and the direct transmission of genetic material. The parasexual cycle in cultures of mammal cells is described on the basis of a simple outline which is suitable for use in teaching secondary school pupils. The author also provides an outline of Clin's experiment to demonstrate the transformation of the cell cultures before they are injected back into a live object.

genetics, molecular biology, cellcultures - 147363.

722. FRITZSCHE, G.:
Gibt es ein Ökologie der Kultur ? (Does an ecology of culture exist ?)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 4, pp. 140-141.

A brief article which discusses an ecology of culture. Man's culture has always developed within a specific environment, under specific conditions of human society. The demarcation lines between various sciences (botany, zoology, general biology, human biology), and among the natural sciences in general, have often made it more difficult to understand ecological relations among organisms and their environment. The author shows how the German educator Schoenichen already in 1928 pointed out that a human ecology exists, as well as the ecology of nations, tribes and hence also human culture.

ecology, human biology, culture + man - 147359.

723. HARPER, G.K.:
Why Not Abolish Ecology ?
Journal of Biological Education, 16, 1982, No. 2, pp. 123-127: 1 tab.

In recent years a great deal of attention has been devoted to biology instruction. It has been found that teachers face various difficulties which include insufficient erudition, poor instruction methods, an inadequately developed system of examinations and finally an insufficient knowledge of natural organisms needed for their rapid identification during field work. The author analyses the problem of ecology and the place of ecology in instruction. He devotes attention to a definition of the term ecology, the subject-matter of this subject and its individual topics. He is against suggestions to exclude ecology from biology instruction and also against some textbooks in which ecological subject matter is distributed throughout the book and attached to various other topics. In the author's opinion ecology should form an indivisible part of biology instruction and form one of its foundations. In most cases laboratory work cannot replace ecological work done in the field.

ecology, biology, interdisciplinary relations, ecology instruction, field work - 147361.

724. JENÍK, J.:
Terminologický slovník XI. Eutrofizace (Terminological glossary - XI. Bringing about eutrophy)
Přírodní vědy ve škole, 33, 1982, No. 1, pp. 10.
Eutrophy is a process in which the content of nutrients in stagnant or flowing waters is excessive and this leads to increased biological production. Such waters contain excessive growths of blue-green algae, algae and higher plants, fewer species are found in plant plankton communities and specie changes occur within the communities of acquatic life. Also the transparency of the water is decreased, its temperature changes and during the summer there is a critical decline in the amount of oxygen at the bottom of water reservoirs and ponds which threatens their fish population. Phosphorus and nitrogen are the two elements which contribute most to eutrophisation.

terminology, glossary, eutrophisation - 147361.

725. JENÍK, J.:
Terminologický slovníček XIII (Terminological glossary XIII)
Přírodní vědy ve škole, 33, 1981/1982, No. 3, p. 89.

A gene pool is a stock of various unique hereditary characteristics found in the genes of living organisms on a specific territory. A gene pool is a significant but unrenewable natural resource, whose importance is much greater than that of other natural resources.

terminology, glossary, gene pool - 147361.

726. JENÍK, J.:
Terminologický slovníček XVI. (Terminological glossary XVI)
Přírodní vědy ve škole, 33, 1981-1982, No. 6, p. 221.

Reservations are areas which according to law have been declared as protected by the government. They are either large or small. The large reservations include national parks and landscape reservation, the small ones include state nature reservations, protected sites, protected parks and gardens and protected study areas. Reservations which have a large number of various species represent specific gene pools for further utilization by man in his economy.

terminology, glossary, nature conservation, environmental conservation - 147361.

727. JENÍK, J.:
Terminologický slovník XIX (Terminological glossary - XIX)
Přírodní vědy ve škole, 33, 1981-1982, No. 9, pp. 330-331.

A climax is an open ecological system in which energy flows and the circulation of matter are in equilibrium with the existing state of the environment. From another point of view this is a mature community which is relatively stable in time and is at the end of a line of evolution (succession). A climax community is a self-regulatory system adapted in all its important functions to equilibrium in relation to the environment and hence is "immortal", unless it is seriously disturbed or destroyed. We can distinguish climatic and edaphic climaxes. The development of a climax is usually the outcome of secondary succession. Even on extensive continents only a few climaxes are found, but 4 are found in Moravia (in Czechoslovakia) - oak and Yoke elm forests in the lowlands, beech forests in the hills, spruce in the higher mountains and Alpine meadows on the higher altitudes of mountains. The author cites examples of other climaxes.

terminology, glossary, ecology, climax - 147361.

728. MOLDÁN, B.:
Terminologický slovníček XII (Terminological glossary XII)
Přírodní vědy ve škole, 33, 1981-1982, No. 2, pp. 51-52.

The author here explains the terms exponential trend and phenology. In the present stage of civilization a number of parameters tend to grow exponentially, not linearly. For instance the consumption, as well as production of a number of products grows exponentially, so that world-wide, the volume of output of such products and everything which is connected with them doubles in a specific period of time. Phenology is a science which studies the influence of biotic and physical factors in time and compares their distribution in relation to various species (communities) or in relation to a single process occuring in relation to alternation of the seasons and changes in climate (humidity and temperature) which are connected with it. The methodological foundations of phenology are based on the development of organisms of an entire biocoenoses and their division into clear and easily recorded sections or pheno-stages. This method is important for eco-system research.

terminology, glossary, ecology, phenology - 147361.

729. JENÍK, J.:
Terminologický slovníček XX (Terminological glossary - XX)
Přírodní vědy ve škole, 33, 1981-1982, No. 10,
pp. 368-369.

The terms landscape and forestry economy are explained. A landscape is a territorial spatial unit with a homogenous or typically heterognous system of physical and biotic elements within natural borders. A different approach stresses a characteristic system of eco-systems within the framework of a naturally formed border. Similar landscapes with common characteristics form a landscape type. The forestry economy is a branch of material production which provides timber for industry and at the same time administers the other functions of the forest for society as a whole, especially its function for the water eco-

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nomy and its utilisation for recreational purposes. This branch belongs to primary production, which gains its energy from solar radiation. The basis for cultivating the forest and for timber production technologies is the ecology of tree communities. In Czechoslovakia forests cover one third of its surface.

terminology, glossary, ecology, landscape, forest economy - 147361.

730. MOLDAN, B.:
Terminologický slovníček - XI - Emise (Terminological glossary XI. Emissions)
Přírodní vědy ve škole, 33, 1981-1982, No. 1, p. 10.

Emissions are substances or energy which are found in the environment as the consequence of industrial or other human activity (transportation, agriculture). They include waste material, as well as semi-products or products which escape into the environment in the process of production, storage or transportation.

terminology, glossary, ecology, emissions - 147361.

731. MOLDAN, B.:
Terminologický slovníček XIII (Terminological glossary XIII)
Přírodní vědy ve škole, 33, 1981-1982, No. 3, pp. 89-90.

The geosphere, lithosphere, pedosphere, hydrosphere, atmosphere, biosphere and noosphere, as well as the man-made biosphere, anthroposphere and sociosphere are all terms which are defined and explained in this part of the glossary in a clear and precise manner.

terminology, glossary, ecology - 147361.

732. MOLDAN, B.:
Terminologický slovníček XIV (Terminological glossary XIV)
Přírodní vědy ve škole, 33, 1981-1982, No. 4, p. 134.

A gradient is a change in a chemical or physical magnitude at a specific time and place. In meteorology the term vertical or horizontal temperature gradient is used, The term is also used in connection with air pressure, while in chemistry a gradient of concentration in a specific substance, for instance in water, is used. Noise is a mixture of sounds of variable intensity and frequency. Intensity is its important characteristic and it is measured in decibels (dB). Noise has become an important problem in the environment and protection against noise is becoming an important factor of environmental conservation and control.

terminology, glossary, ecology, noise - 147361.

733. MOLDAN, B.:
Terminologický slovníček XV. (Terminological glossary XV)
Přírodní vědy ve škole, 33, 1981-1982, No. 5, p. 171.

The author explains the term chemicals in the environment. Their use causes the chemical pollution of the environment by locally, regionally or globally changing the concentration of specific chemical substances in the environment and disturbing the spontaneously formed previously existing chemical equilibrium. Substances are introduced into the environment which have never existed there before or only in minute concentrations. Geochemical pollution concerns above all sulphur dioxide and other sulphur compounds; also the content of carbon dioxide, nitrogen oxides and halogen hydrocarbons used in spray cans which threaten the ozone layer in the atmosphere have been increasing. Global environmental pollution is also caused by the use of pestacides, as well as the 4000 substances used by the pharmaceutical industry, the 2000 chemical preservation substances, as well as various other additives which may have mutagenic, carcinogenic, pathogenic and allergogenic effects.

terminology, glossary, ecology, use of chemicals, environmental conservation - 147361.

734. MOLDAN, B.:
Terminologický slovníček XVI. (Terminological glossary - XVI)
Přírodní vědy ve škole, 33, 1981-1982, No. 7, p. 248.

Environmental conservation is the task of society as a whole as well as each individual. All bodies formed on the basis of the constitution in Czechoslovakia as well as in the Czech and Slovak Socialist Republics, participate in this work. In this context especially the Environment Committee of the Czechoslovak Government should be cited. This committee deals with problems of an international nature and those concerning the country as a whole, Other bodies specifically concerned with environmental control include the Federal Ministry of Technical and Investment Development, bodies belonging to the Councils for the Environment attached to both the Czech and Slovak governments, the Ministry of Public Health, the Ministry of Forestry and Water Economy, the Ministry of Construction, the Ministry of Technology, the Ministry of Agriculture and Nutrition, the Ministry of Culture, Regional National Committees, the Czechoslovak Academy of Sciences and government various inspection bodies.

terminology, glossary, environmental control, ecology - 147361.

735. MOLDAN, B.:

Terminologický slovníček XVII. (Terminological glossary XVII)

Přírodní vědy ve škole, 33, 1981-1982, No. 8, pp.289-290.

The author explains the terms temperature inversion and climate. A temperature inversion can be at the ground level or at various altitudes, sometimes even one above the other. It always means that conditions for the dispersion of emissions in the atmosphere are poor and sometimes an inversion can lead to catastrophic consequences. Inversions occur most frequently in the autumn and winter on clear days, often in enclosed valleys. When the temperature gradient is small, warm air does not rise and upper and lower layers of air do not mix sufficiently. An inversion occurs when the layer of air next to the earth's surface is cooler than an overlying layer. The climate is a sum of weather conditions at a given site, while the weather is a momentary state. The determining factors in the climate are temperature, the quantity of precipitation and their course throughout the year. Within the framework of large units, different climatic zones can be distinguished, as well as a continental or ocean type climate. Landscapes or smaller units often have their own specific mezzoclimate and individual natural or anthropogenic formations have their own micro-climate. The climate has greatly fluctuated in the course of geological history, glacial cycles are repeated every 11700 to 12600 years. These changes are explained by several different theories - such as the Albeda theory, the theory of atmospheric radiation balance and the theory of the glasshouse effect which is the consequence of an increase of carbon dioxide in the atmosphere.

terminology, glossary, ecology, temperature inversion, climate - 147361.

736. NAYDENOV, S. - BAYKUSHEVA, S.:
Mikrobiologichna transformatsia na teshkite metali v prirodata (Microbiological transformations of heavy metals in nature)
Biologiya i khimiya, 25, 1982, No. 3, pp. 10-16.
4 figs.

Heavy metals are a part of the Earth´s crust and through specific processes they can enter the soil. These processes include burning, mining of ores, industrial activities, the use of chemicals in agriculture, etc. The most important heavy metals are mercury, arsenic, lead, tin, antimony, copper, cadmium, chromium, nickel and vanadium. In the environment they act as a polluting factor in water, the soil and through them in food. Heavy metals are toxic for humans, animals, plants and microorganisms. Their danger in this way travels from one environment into another. Small fluctuations in the level of biological and chemical circulation of these highly toxic substances can lead to large concentrations. Such physical processes as adsorption into colloid particles, evaporation and bio-accumulation lead to concentrations of this pollutant, but they do not transform it in any way. Biological, chemical and photosynthetic reactions on the other hand lead to the formation of new substances which can still be more or less toxic for living organisms. Usually the mutual interaction of organisms (bacteria, fungi, algae and protozoa) and heavy metals plays a primary role in these processes. The mutual reaction of heavy metals and microorganisms can be of a varied nature and can occur inside or outside the cell. Usually valency is changed,new complexes are formed. The article describes these changes with the aid of various outlines of biochemical cycles in which mercury, arsenic and their various compounds form organic structures. On the basis of the examples cited it becomes evident that microbiological transformations are responsible to a great extent for the fact that heavy metals have become so often disseminated into the biosphere.

ecology, environmental conservation, heavy metals - 147396.

737. RÄUBER, H.:
Licht als Hauptzeitgeber für Biorhytmen (Light as the main cause of biorhythms)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 349-350.

For a long time the effect of light on animals was not taken into account sufficiently. Changes in this respect have occured only in recent years. Studies carried out at the University of Leipzig, have among other indicated that light, next to temperature and humidity, is the most important abiotic factor influencing physiological processes. It has a special effect on biological rhythms. Light acts through the hypothalamus on the hypophysis and also on the epiphysis. The author explains the significance of these findings for the breeding of pigs and the importance of chronobiology in farm animal breeding.

general biology, biorhythms, ecology, light - 147361.

736. PLADEK-STILLE, J.:
Kybernetische Aspekte im Biologieunterricht. Eine Unterrichtsreihe in einem Grundkurs der Jahrgangsstufe 12 (Cybernetical aspects in biology teaching. Thematic unit in the basic course of the 12th class of secondary school)
Der Biologieunterricht, 18, 1982, No. 3, pp. 4-41.
Lit. 28, 4 models for transparencies, 5 tabs.

Cybernetics is now penetrating all the sciences: it is used not merely in mathematics and the technical sciences but also in medicine, psychology, education, sociology, philosophy and aesthetics. Cybernetical methods have become a common platform for all these sciences. It is also used in the biological sciences, for instance in physiology, in studying the nerve and hormonal regulation of various organs, in studies of the Kelvin cycle, the Krebs cycle, the regulation of enzyme cycles, the study of ecological processes, matter and energy circulation, in the study of natural equilibrium in biotopes and in the study of behaviour patterns of various organisms. The author discusses whether cybernetics and its problems can be integrated into the biology syllabus and suggests the following outline for teaching cybernetics within the framework of the biology course: 1st lesson: an introduction to cybernetical biological problems, 2nd and 3rd lesson: technically and biologically controlled regulation, the control and measurement of the amount of water and concentration of gases in the blood, 4th lesson:

reaction of the pupil in the human eye and the biological regulation of systems, 5th and 6th lesson: the spontanous control of muscle movement, 7th lesson: the coordination of antagonistic muscles in a chain regulation system and the fine regulation of volition movements of the muscles. The whole topic is planned in detail by the author and various critical comments are added. Also a preliminary test and didactical test are provided, as well as models for transparencies.

instruction + biology, cybernetics, secondary school - 147375.

15.5 Medicine, health care

739. HORN, U. - HOFFMANN, H.:
Vorklinische Wirkstoffprüfung im Entwicklung neuer Arzneimittel (Pre-clinical verification within the framework of developing new drugs)
Biologie in der Schule, 31, 1982, No. 10, pp. 141-145. 1 fig.

Verifying the effect and harmlessness of new drugs is one of the basic prerequisites for using them on humans. Already in 1966 WHO issued recommendations for testing drugs on animals. In the GDR a general test of toxicity is carried out on the basis of which human tolerance towards the substance is assessed. Other tests serve to determine the possible mutagenic and carcinogenic effects of the new drug. Pharmacokinetic and pharmacological tests are also carried out. Finally the new drug is tested on people. The development of a new drug takes an average of 8 to 10 years.

medicine + science, pharmacology, drugs, research, tests, laboratory animals - 147359.

740. LUKYANOVA, B.M.:
Kardiologiya v sluzhbe zdorovya (Cardiology in the service of health)
Biologiya v shkole, 56, 1982, No. 6, pp. 12-14.

A great deal of attention is at present devoted to a study of cardiovascular disease, which hold a foremost place as the cause of death in the developed countries. The causes of these diseases are studied, as well as their mechanism, etc. In 1982 a new unique scientific and therapeutic facility was commissioned for use, the All-Union Cardiological Centre of the Academy of Medical Sciences of the USSR where optimum conditions have been formed for the study of heart and circulatory disease. A uniform cardiological services is now being set up throughout the Soviet Union. 14 republican centres and their affiliations have already been set up, as well as 20 cardiac disease outpatient clinics, 600 cardiological clinics with 51 000 beds and 400 special teams for providing rapid aid. In 1982 a World Cardiology Congress was held in Moscow, where new Soviet cardiological technology was demonstrated which makes it possible to control the functioning of the heart. The final aim of cardiology is to construct an artificial heart. Also the study of arteriosclerosis and thrombosis as well as new cardiosurgical techniques now have priority in the USSR.

medicine + science, heart, cardiology - 147359.

741. Uchoniye - zdravookhraneniyu (The contribution of science to health care)

Biologiya v shkole, 56, 1982, No. 6, p. 14.

At the laboratory for general resuscitation of the Academy of Medical Sciences in the USSR physiological processes which occur in death and resuscitation are studied. Fibrillation of heart ventricles and methods of refibrillation are studied and their utilization in electrical impuls therapy.

medicine + science, heart, cardiology, resuscitation - 147359.

742. VENKER, P.:

Menschliche Interferone gegen Virus - und Krebserkrankungen (Human interferon against viruses and cancer)

In 1935 Magrassi observed that cells attacked by non-pathogenic viruses will reject pathogenic viruses. He called this phenomenon virus interference. But is was only in 1957 that Isaac and Lindemann found the cause of this effect - cells infected by a virus produce a substance which in other cells produces an antiviral reaction. This substance has received the name interferon and as further study has indicated, it acts not only against viruses, but it also surpresses the growth of specific malignant tumors. All the cells of vertebrates are capable of interferon production, including of course humans. Their production takes place through inducers which can be viruses, bacteria and also other types of microorganisms or specific biological macromolecules (such as NK) and also some low molecule synthetic compounds. Interferon is specie specific and its type depends on the cell which produces it, not on the inducer. In any case it is a glycoprotein which accumulates on the external membrane of the cell and from there mobilizes the cell and its defensive mechanism. But it also influences the growth and division of cells and perhaps also the regulation of cellular growth and cell differentiation. Humans produce three types of interferon: alpha, gamma and beta, Human leucocytes infected by a virus produce alpha interfron. In 1980 scientists were successful in inserting human genes into bacteria to produce human interferon and thus to achieve a higher production of the substance than had hitherto been possible. Such genes have also been put into yeast cells. Since now interferon can be produced in sufficient quantities it can be clinically tested for its therapeutic effects.

medicine + science, virus, cancer, interferon - 147359.

743. WENK, P.:
Wie entkommen Parasiten den Immunenabwehr ? (How do parasites overcome immunological defences ?)
Der mathematische und naturwissenschaftliche Unterricht, 35, 1982, No. 8, pp. 454-460. Lit. 7, 2 figs. 1 tab.

Parasitical and infectious diseases cannot be combated in the same way. Diseases caused by viruses or bacteria are combated on the basis of immunological principles, but parasites usually have a highly developed reproductive capacity which enables them to survive. Some parasites have to overcome the immunological reaction of the host, while others change the antigen pattern of their surface area just as a chameleon changes colours, so that an immunological reaction does not take place; a third type of parasite cover themselves with a protein layer taken from the host and thus make identification impossible. From all this it follows that immunological methods cannot be used against parasites, but an immunological reaction would be extremely welcome because more than a billion people today suffer from parasitical diseases such as malaria, amebiasis, sleeping sickness and Chagas' disease. While the death rate from these disease is no longer very high, it still represents approximately 2 million people annually. Parasitical disease tend to be long-term, chronic and without treatment they cause death or severe damage to the organism. Spontaneous overcoming of the disease does not exist. In endemic areas superinfections occur, when the number of cases sharply increases. Among the parasites which mask themselves with the proteins of their host is Schistostoma, among those which paralyze or neutralize the host's immune reaction is filariasis and among the parasites which change the antigen pattern of their surface is the sleeping sickness parasite. When an organism is attacked by nematodes, an allergy often results.

medicine + science, parasites, immunity - 147359.

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15.6 Agriculture and crop engineering

AMBRETTI, W.:
Problemi della ricerca applicata nel agricoltura I.
(Problems of applied research in agriculture)
Scuola e didattica, 26, 1980-1981, No. 8, pp. 58-59.
2 figs.

The introductory part of a series of articles concerning applied research in agriculture, which concerns the work of breeding, research laboratories, etc. and also the implementation of findings in practical agriculture. At the same time pupils learn about how research in general is carried out, etc. This introductory part only outlines the whole problem and discusses practical observations carried out during field trips and also how to organize instruction on this topic.

research + agriculture, agricultural engineering, field trips, observations - 147367.

745. AMBRETTI, W.:
Problemi della ricerca applicata nel agricoltura II
(Problems of applied research in agriculture - part II)
Scuola e didattica, 26, 1980-1981, No. 9, pp. 44-45.
1 fig.

The author describes a field trip made with pupils to a farm research laboratory. Before the excursion the teacher discusses with pupils the importance of applied research, how research is organized and its most important tasks. Also various observation projects for the excursion are discussed, such as observing the various instruments used in experiments to determine the acidity of the soil, cultivating samples in test tubes, a study of various plastics suitable for building a hothouse, etc.

agriculture, agricultural engineering, research, excursions - 147367.

746. AMBRETTI, W.:
Problemi della ricerca applicata nel agricoltura - III
(Problems of applied research in agriculture - part III)
Scuola e didattica, 26, 1980-1981, No. 10, pp. 56-57.

This article deals with how the observations pupils have made in an agriculture research laboratory should be made use of in the classroom. In subsequent experiments done in class, pupils learn to use the same logical procedures and methods used in applied agricultural research: for instance determining the suitability of a specific soil for the cultivation of specific plants and formulating correctly the problem of the acidity of the soil, etc.

agriculture, agricultural engineering, research, excursion - 147367.

747. JANIN, C.L.:
L'humus e la fertilitá del suolo (Humus and the fertility of the soil.)
Scuola e didattica, 26, 1980-1981, No. 8, pp. 37-38.
3 figs.

The article explains the prerequisites for creating fertile soil and explains in detail the characteristics of humus and how it is formed. The author describes an experiment to demonstrate how the soil can be enriched, but also the dangers posed by the use of chemicals for improving the fertility of the soil. Another experiment deals with separating humus and soil particles.

agriculture, agricultural engineering, pedology, humus - 147367.

748. JANIN, C.L.:
Preparazione del concime I. (Making compost)
Scuola e didattica, 26, 1980-1981, No. 9, pp. 24-25. 3 figs.

In the first part of the article which describes the teaching of this topic, the author recommends making a survey of various waste which makes its way into the soil, especially organic waste and its systematic utilization by agriculture. In classical agriculture in small villages all waste was utilized, but in large population concentrations other methods must be used to dispose of organic waste. The author describes the process of decomposition under conditions when the process takes place in the presence of air. Students can do experiments in which temperature is measured, as well as decomposition time, etc. and the influence of other factors, such as humidity and the presence of acids or salts, etc.

agriculture, agricultural engineering, compost, fertilizers - 147367.

749. JANIN, C.L.:
Preparazione del concime II (Making compost - II.)
Scuola e didattica, 26, 1980-1981, No. 10, pp. 40-41.

Here the author provides practical instructions on making a compost pile, its division into various layers, etc. Pupils learn about the presence of various chemical elements in compost, under what conditions it can be used as a fertilizer and the characteristics of good compost. The techniques used in agriculture and in large agricultural enterprises are also described, since they greatly differ from those used by classical small-scale farmers.

agriculture, agricultural engineering, compost - 147367.

750. KONOVALOV, Y.B.:
<ins>Semenovodstvo polevikh kultur</ins> (Cultivating seeds of crop plants)
Biologiya v shkole, <ins>56</ins>, 1982, No. 3, pp. 6-12, 2 figs.

The author, who is a professor at the Moscow Academy of Agriculture, describes the importance of seed production for agriculture. He first explains the process of selecting high quality varieties and the importance of good quality seeds for increasing the crop output per hectar of land and hence the productivity of agricultural production, Then the organisation of seed production in the USSR and the complex road from laboratory research up to practical planting is described.First suitable individual plants of a given variety must be selected, their genetic purity determined and finally seeds are cultivated, harvested, stored and sent to agricultural enterprises. In conclusion the tasks given to seed production by the XXVIth Congress of the Communist Party of the Soviet Union are described.

agricultural crop engineering, seed production, USSR - 147367.

751. Nauka selskomu khozyastvu strani (The contribution of science to the agriculture of the country) Biologiya v shkole, 56, 1982, No. 6, pp. 15-17.

The May Plenary Session of the Central Committee of the Communist Party of the Soviet Union held in 1982 set the principles for the further development and increase in efficiency of agricultural production. The article provides a survey of basic facts for teachers which they can use in school work to motivate pupils and provide examples concerning the success achieved in the selection of new varieties of crop plants, new industrial technologies and products, as well as new techniques which are being introduced into agriculture. Also the problems and tasks of gene engineering and plant selection are discussed, as well as research concerning micro-organisms, biotechnologies for protein synthesis and biologically active substances, etc. Scientists are studying complexons, which are complex chemical substances which capture metal ions from water solutions of metal compounds and which can be used to combat chorosis of plants. The article also describes the outcome of the work done by teams of scientists in the whole USSR such as high production varieties of crop plants resistent to disease and pests, cultivating a cross between wheat and rye called Triticale, the cultivation of plant strains which have a high adaptation capacity, combining the traditional hybridization of geographically varied varieties with experimental mutagenic processes, chemical regulators of growth of plants, potato selection, new fodder products, etc.

agriculture, agricultural engineering, genetics, selection and bredding + agriculture, USSR - 147367.

752. OVERTON, L.J. - OWEN, H.J.:
Nitrogen Fixation and Crop Production
The School Science Review, 63, 1982, No. 224, pp. 483-487.
2 figs., 3 tabs.

The author describes a laboratory experiment dealing with the influence of nitrogen on the growth of plants. He recommends using barley, orchard grass and white beans. Seedlings in three vessels produced the following findings: barley or orchard-grass cultivated without nitrogen are small, insufficiently green and have very few meristems. But if these plants are cultivated without nitrogen but together with beans, they grow tall, have a large number of meristems and have a colour very similar to that of plants cultivated with nitrogen fertilizer. The experiment shows that the viviaceae plants capture nitrogen from the air and enrich the soil with nitrogen compounds which can then also be utilized by non-viviaceae plants. The experiment is easy to organize and suitable for school laboratories.

agriculture, agricultural engineering, viviaceae, nitrogen, experiment - 147367.

753. POSYPANOV, G.S.:
Zernoviye boboviye kormoviye rasteniye (Viviaceae plants cultivated for fodder and seeds)
Biologiya v shkole, 56, 1982, No.

Viviaceae plants are an important component of crop production; they are cultivated as technical crops (soybeans, peanuts), as fodder, as seeds and as green fertilization of the soil. Not only the seed but also the vegetation of these plants is very rich in proteins. The herbage of viviaceae contains 6 to 10 %

protein, while the straw of cereals only 2 to 4 %. The seeds of the former have up to five time more protein than the seeds of cereals. Pea seeds contain 22 %, vetch 25 %, forage lupine 34 % and soybeans as much as 39 % proteins. The proteins of viviaceae are easily digestible and have a wide range of aminoacids. Soybeans produce twice as much proteins from a hectar of land in comparion to cereals. All these plants are able to bind nitrogen from the air, through the bacterium Rhizobium. The symbiosis between nitrogen bacteria found on the roots of viviaceae creates the mechanism for what is called green fertilization. These plants make excellent forage since for the production of 1 kilogram of animal protein, 7.5 kilograms of plant protein must be consumed by the animal. Young vivaceae plants become infected with virulent strains of specific root nitrogen bacteria; the degree to which the bacteria are bound to the roots depends upon the pH factor of the soil, temperature, the amount of available moisture, as well as sufficient amounts of P, K, B and Mo available in the soil. There are 11 species of Rhizobium which differ in their activity and demands they make on the soil environment.

agriculture, agricultural engineering, nitrogen, viviaceae - 147367.

754. RÄUBER, H.:
Biologische Krautung der Gewässer (Doing away with plants growing in water areas)
Biologie in der Schule, 31, 1982, No. 9, p. 396.

Until now clearing water areas of plants has been done either mechanically or chemically. In recent years a more economical method has been developed, which is also less dangerous for the environment than chemical methods and requires less work than mechanical methods. A herbivorous fish of the Cyprinidae family is used for the purpose, for instance the carp (Carpinus carpio) and a number of other species which are described by the author. Ctenopharyngodon idella has been put into 500 hectars of ponds and lakes in the GDR (approximately 5 % of all water areas) with very good results and this method will be used more extensively in the future.

fish breeding, plants + water, aquatic environment, water pollution, fish - 147361.

755. RÄUBER, H.:
Gedanken nach dem XII. Bauernkongress der DDR - 1982
(Comments on the 12th Congress of Farmers of the GDR in 1982)
Biologie in der Schule, 31, 1982, No. 7-8, pp. 278-283.
2 tabs.

After this congress a discussion was begun concerning problems of farm policy and farm economic, which is only understandable if we take into consideration that the problem of cereals is now comparable to the petroleum problem several years ago. Already at present the USA, which provide 50 % of the world's wheat exports, 75 % of its maize exports and 80 % of its soybean exports are using this fact as a political weapon. In the USA there are 2.0 hectars of agricultural soil per inhabitant while in the GDR this figure is only 0.37 hectars and in Czechoslovakia 0.46 hectars. From this follows the need to take to a greater extent into consideration the laws of nature in agriculture, to persue a policy of increasing the fertility of the soil, and to more rapidly implement the findings of agricultural science into practical farming.

agriculture, GDR, congress - 147367.

756. SVETOV, V.A.:

Agrokhimicheskaya slushba (Agrochemical services)
Biologiya v shkole, 56, 1982, No. 1, pp. 10-14.

The development of an agro-chemical complex has a special role to play in the development of the national economy of the USSR. Agriculture will develop through intensification, a transition to an industrial method in agriculture and the use of progressive technologies. A primary task is the improvement of soil fertility. The use of chemicals represents one such method, especially the use of mineral fertilizers, chemical methods of plant and animal protection against pests and improving the productivity of animal husbandary. The author analyses the history of the use of chemicals in agriculture and on the basis of specific examples documents the existing situation and outlooks for further developments.

agriculture, intensification + output, agricultural engineering, zootechnologies, USST - 147367.

757. KÖHLER, H.:
Zur Mikrobiellen Assimilation und Dissimilation des Stickstoffes im Boden - I (Concerning the microbial assimilation and dissimilation of nitrogen in the soil - part I)
Praxis der Naturwissenschaften im Unterricht - Biologie, 31, 1982, No. 6, pp. 161-175. Lit. 44. 8 figs., 1 tab.

This subject matter is here analysed from the point of view of instruction in the 12th and 13th classes of general education secondary schools. The author describes microbial assimilation and dissimilation of nitrogen from the point of view of plant physiology. He first describes the mechanical and chemical breakdown of the plant material by soil organisms, and then provides an analysis of the causes of mineralization. A problem teaching approach leads to a number of observations and experiments with mineralization. Also the course of carbon dioxide and ammonia production can be demonstrated in the course of a long-term experiment. The experiments described allow pupils to gain insight into the mineralization process, as well as the immobilization of nitrogen in the soil. By the mineralization process chemicals return to the soil from the dead biomass produced by plants. The author also describes the circulation of nitrogen in this process. The topic is divided into 16 teaching lessons and 3 hours for an written essay.

instruction + biology, microbiology, cirulation + nitrogen, experiment, teaching topic, secondary school, FRG - 147361.

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758. KUBIŠTA, V.:
Bioenergetika - dýchání a kvašení (Bio-energy - respiration and fermentation)
Přírodní vědy ve škole, 33, 1981-1982, No. 7, pp. 282-284.

The article is intended as a supplement for teaching this subject-matter and places special stress on interdisciplinary aspects (biology with physics and chemistry). In textbooks biology continues to be a descriptive science, yet the purpose of teaching this subject in general education secondary schools is to provide a notion of the basic laws of biology for future engineers, economists and other professionals who will never again study the subject, yet will have a say in a number of biological problems, including for instance problems of hygiene and the environment. All biological processes are connected with the transformation of energy. A cell is an autonomous energy unit. Within the cell, energy is used for biosynthesis, for the transportation of substances (the majority of cells are capable of transporting ions across cellular membranes), and for movement (as in muscle cells). Heterotrophic cells obtain energy only by degrading nutrients, i.e. by catabolism; energy gains as such are predominantly provided by reactions of a single type - oxidation-reduction reactions. However, an aerobic metabolism is much more advantageous from an energy point of view. The author also describes the development of membrane potential and the transmission of energy within the cell. The energy of both the aerobic and anaerobic metabolism is finally stored in energy-rich ATP structures. Each cell must produce its own ATP. Modern biology has shown that besides redox potentials also membrane potentials are very important in all cell processes.

general biology, molecular biology, bio-energy, biochemistry, bio-physics, instruction + biology, interdisciplinary relations, secondary school - 147361.

759. MENNER, M. - BOCKER, H.:
Die Bedeutung der Biotechnologie für die sozialistische Gesellschaft (The significance of biotechnologies for a socialist society)
Biologie in der Schule, 31, 1982, No. 5, pp. 177-184.
1 tab.

Intensive microbiological and biochemical developments have led to the rapid development of industrial microbiology. In spite of the fact that biotechnologies are a new field, their empirical basis has existed for thousands of years (for instance in the production of beer, wine and dairy products). Besides processes based on microorganisms, also the utilization of mammal cells, antigens and immobilized enzymes belong to this category, as well as the synthesis and transformation of substances in fermentors (the biosynthesis of antibiotics, organic acids, polysaccharids, aminoacids, vitamins and enzymes). Biotechnologies have the advantage of more economical production, the use of non-conventional primary substrates and also the fact that they do not harm the environment. These processes utilize procedures developed by genetic engineering. The authors stress the need for interdisciplinary relations and compare the opportunities provided by biotechnologies under capitalism and under socialism.

biotechnologies, microbiology, molecular biology, interdisciplinary relations - 147361.

760. MONTKOWSKI, M. - THIELE, J.:
Verwertung von Abprodukten der Land-, Forst- und Nahrungsgüterwirtschaft (Utilizing the waste produced by agriculture, forestry and the food processing industry)
Biologie in der Schule, 31, 1982, No. 6, pp. 265-267.

One of the tasks of agriculture is to prevent water pollution with its waste. This concerns for instance manure, which can be used for the fertilization of the soil, but also for the production of protein--rich fodder or the production of biogases. Straw is used as fodder, but it can also be used for making paper, as a component of compost for champignon cultivation and as a substrate for making bacterial proteins. In the food processing industry whey is a valuable waste material which can be used in wine and alcohol production, the production of lactose, milk proteins, etc. In a similar manner the waste produced in sugar production based on sugar beets, or in the processing of potatoes, meat, etc. can also be utilized. In forestry, the remnants of wood and bark can be made use of.

microbiology, biochemistry, agticulture, forestry, chemistry + technologies + engineering, waste - 147371.

761. Nauka - selskomu khozyastvu strani (The contribution of science to the agriculture of the country)
Biologiya v shkole, 56, 1982, No. 5, pp. 13-15.

Scientists in Kirgizia have concentrated on the cultivation of new strains of wheat, barley and maize. They have achieved their greatest success with wheat where they have cultivated the strain "Intensive". Agricultural scientists at Mironovsk have bred a new wheat strain suitable for cultivation in the Ukraine and Volga river basin. Specialists in Moldavia have developed the methodology of producing hybrid seeds of maize. Scientists from the Biotechnological Institute have developed methods for obtaining a number of enzymes with the aid of microorganisms, while in another institute a biologically active substance which speeds up the growth of plants has been developed. The article also describes other successful projects which have been developed in the various Union republics.

agriculture + selection, seed production, microbiology, USSR - 147367.

762. Perspektiven der Biotechnologie in der USSR (Outlooks for the development of biotechnologies in the USSR)

Biologiya v shkole, 31, 1982, No. 11, pp. 490-491.

Biotechnologies include various technological processes which are based on the utilization of microorganisms or the products of their activity. They are based on genetic engineering, technical microbiology and technical enzyme production. The production of methane and vitamin B_{12}, which are described in detail, can serve as examples of the practical utilization of biotechnologies.

microbiology, microorganisms, genetic engineering - 147361.

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763. REISS, J.:

Der Einsatz von Mikroorganismen zur Gewinnung von Eiweiss (The use of microorganisms for obtaining proteins)

Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 10, pp. 300-304.

The population of the Earth is constantly increasing. In 1974, 4 billion people lived on Earth and it is assumed that in the year 2000 there will be 7 billion. The majority of people eat cereals, as do domestic animals. But cereals contain only a limited amount of proteins (from 7 to 10 %). In 1973 the protein deficit in the world was 30 million tons annually and the situation continues to deteriorate. Only the USA, Canada, Australia, New Zealand and South Africa can export large amounts of proteins, while the remaining world, including all the countries of Europe, have a shortage of proteins. For this reason biotechnologies have been developed which produce proteins with the help of microorganisms. Such protein is called single cell protein and can be produced by bacteria, yeast or fungi. The primary substrate for such productions include waste from the food processing industry. Before such proteins are put into use as human food they must first undergo extensive toxicological tests. The whole process is considered to be extremely promising. Among the raw materials of such processes are carbohydrates and their derivatives such as methane, methanol, ethanol, various sugars, waste water from starch producing plants, molasses, urban waste and also various microorganisms which are enumerated and described in the article. Each type of raw material requires a specific specie of microorganism. The Swedish firm Symba already produces a biomass out of starch. Also the production of proteins by microorganisms out of cellulose is very promising. Such production would be economically extremely inexpensive. For producing 60 to 100 thousand tons annually, a staff of 100 persons is sufficient. The need for soil is minimal and production does not depend upon the weather. The product is always homogenous and of a constant quality, has the same composition and can be delivered to any place in the world. The consumption of energy is also relatively small. Such proteins are 90 % digestible.

microbiology, microorganisms, production + proteins, waste - 147371.

764. WÜNSCHE, L.:
Nützung unkonventioneller Substrate zur mikrobiellen Proteinerzeugung (The use of unconventinal substrates for the microbial production of proteins)
Biologie in der Schule, 31, 1982, No. 5, pp. 214-219.
3 figs., 4 tabs.

The world annual deficit in food production (especially proteins) is about 25 million tons. While in the developed countries the daily per capita consumption of proteins is 90 g, in the developing countries this figure is only 57 g. Solving this problem assumes the intensification of production processes and finding new food sources, as well as using new technologies. One such possibility is the large scale production of proteins by unicellular organisms (single cell protein) which from a qualitative point of view does not differ from other proteins. A number of microorganisms are suitable for this purpose, for instance green algae, the Candida yeast genus, bacteria, etc.

The advantages of this type of protein production are that output is not dependent on the weather, productivity per unit of area is very high, various substrates can be used, such as waste or the intermediary products of various processes, for instance molasses, whey, the product of cellulose hydrolysis or the hydrolysis of starch, wood, waste from fruit and vegetable processing, as well as various hydrocarbons and alcohols. Also non-conventional substrates such as petroleum fractions, natural gas (methan) or methanol are used. The author analyses the microbiological and biochemical foundations of using such substrates and the technological basis of these processes, as well as the quality of the final product.

microbiology, microorganisms, production + proteins, waste - 147371.

15.72 History of biology

765. BESSE, W.:
Max Delbrück und die Geschichte der Molekulargenetik
(Max Delbrück and the history of molecular biology)
Biologie in der Schule, 31, 1982, No. 6, pp. 252-255.

On March 9th 1982 the first anniversary of the death of the outstanding molecular biologist and genetist M. Delbrück was commemorated. He was born on September 4th 1906 in Berlin and his school produced first findings on the structure and function of genetic information. It is also interesting to note that this Nobel Prize laurate never studied biology but first devoted his energies to astro-physics and later to theoretical physics and mathematics. Timofejev-Ressovskij introduced him to a study of genetics. In 1935 he developed a quantum mechanics model of the gene. In 1937 he emigrated to the USA. He not only introduced physics methods into biology, but also a physics approach and way of thinking. He was the first to understand the importance of bacteria and phages for the study of genetics. In 1946 he discovered the suitability of phages for cross-breeding. In conclusion the author speaks very highly of his work in organizing research.

genetics, molecular biology, history - 147361.

766. LAUMANN, M.:
Zur Geschichte der Bakteriologie und des 100. Gedanktages der Entdeckung des Tuberkulbazillus durch Robert Koch (1882) (On the history of bacteriology and the 100th anniversaty of the discovery of the tuberculosis bacterium by Robert Koch in 1882) Biologie in der Schule, 31, 1982, No. 2-3, pp. 111-114. 1 tab.

Bacteriology as a full-fledged science came into existence 100 years ago. But already the writings of members of the Hippocratic School describe epidemic diseases. At the beginning of the last century epidemiology began to develop and to study diseases which are contageous by contact; the motivation for these studies were the still rampant cholera epidemics. The work of Pasteur and F. Cohn (1828-1898) led to the development of methods for cultivating and observing bacteria - mostly on boiled potatoes or liquid soil. Cohn was convinced that one bacterium cannot change into another. In 1866 R. Koch during microscopy observed the genus Vibrio, but his methodology was not sufficiently developed to allow him to achieve significant findings. Later he was successful in finding the cause of tuberculosis. The author describes now this subject--matter can be used in biology instruction.

history + biology, medicine, bacteriology, tuberculosis - 147361.

767. SUCKER, U.:
Kalendarium zur Biologiegeschichte 1982 (The calendar for 1982 and the history of biology)
Biologie in der Schule, 31, 1982, No. 1, p. 40.

The purpose of publishing this calendar is to promote an interest in the history of biology and to help the teacher make use of various important anniverseties in the course of instruction. In 1982 we shall commemorate the 100th anniversary of the death of Theodor Schwann, one of the creators of cellular theory and the 25th anniversary of the death of C.A. Scheunert,who studied the biochemistry of the digestive system of farm animals. For both scientists biographical data and descriptions of their work are given.

history + biology, cellular theory, biochemistry - 147461.

768. SUCKER, U.:
Kalendarium zur Biologieunterricht 1982 (The calendar for 1982 and the history of biology)
Biologie in der Schule, 31, 1982, No. 2-3, pp. 108-111.

In 1982 we shall recall the 150th anniversary of the death of J.W. Goethe, the 100th anniversary of the death of Charles Darwin, the 50th anniversary of the death of M. Rubner, the 150th anniversary of the death of G. Cuvier, the 175th anniversary of the birth of R. Agassize, the 275th anniversary of the birth of G. Buffon, the 350th anniversary of the birth of J. Sacks. J. Ray divided plants into monocotyledous and dicotyledous 300 years ago and 125 years ago L. Pasteur proved that the hypothesis concerning self-fertilization is false. 100 years ago R. Koch discovered the bacterium which causes tuberculosis. 75 years ago T.H. Morgan chose the Drosophila fly as an object for genetic studies and 50 years ago G. Dornag discovered the therapeutic effect of sulphonamids.

history + biology, anniversary - 147361.

15.8 Outstanding scientists, anniversaries, deaths, outstanding biology educators and scientific societies

769. BEILER, A.:
Friedrich Junge: Seine "Gesetze" sein "Dorfteich" und die moderne Unterrichtsplanung (Friedrich Junge: His "Laws", "Village pond" and the modern planning of instruction)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 9, pp. 321-322.

Friedrich Junge (1832-1906) and his book Der Dorfteich als Lebensgemeinschaft (A village pond as a living community) is again becoming popular. He was not really interested in a living community as such, but rather in the laws of development of the organic world. Junge's work was based on the work of Möbius on biocoenoses and he also used the work of L.K. Scharda, a zoologist from Vienna who formulated 16 laws of the organization of living organisms. Junge carried out an assessment of these laws and used them in biology instruction. He specifically stressed the unity of the living world and thought that general laws can be derived from a study of living communities. He formulated his laws in the following manner: 1. All living organisms are characterized by the fact that they are composed of cells, the basic unit of all organisms, which are uniform in their structural patterns. 2. All organisms are characterized by the intake of matter, its transformation through metabolism and output of matter. 3. All organisms multiply. A new organism develops on the basis of combining two germinal cells or by cell division and the further development of vegetative organs (The principle of maintaining the species). 4. All organisms inherit their structure, function and way of life according to specific laws and transmit their hereditary characteristics. 5. All organisms are constantly variable and are subject to evolution during the development of the Earth, from simple forms into more complex ones. 6. The structure, function and way of life of organisms are mutually linked together. 7. The relationship between various organisms among each other and organisms and the environment are based on fixed patterns. 8. Animals have their own specie specific internal life which becomes apparent in their behaviour.

history + biology, Friedrich Junge - 147361.

770. FISCHER, E.P. - STENT, G.S.:
Einfache Einsichten und letzte Fragen. Zum Leben von Max Delbrück (1906-1981) (Simple and final questions. Comments on the life of Max Delbrück 1906-1981)
Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 4, pp. 102-105. Lit. 2.

Max Delbrück was born in Berlin in 1906 and died in Pasadena, California in 1981 at the age of 74. He was the founder of modern molecular biology for which he recieved the Nobel Prize in 1969. His father was a historian and his mother was the granddaughter of J. von Liebig. As a scientist he was first interested in astronomy, atomic mechanics and theoretical physics (in which he recieved a degree in 1930 in Göttingen where he studied under Max Born and Walter Heitler). He then worked in Bristol, in Copenhagen under Niels Bohr and in Zurich with G. Gamov and W. Pauli. His work on the principle of complementarity led him to a study of atomic physics. In 1932 in Berlin he founded a private scientific club which discussed the mutual links between physics and biology. Here he became interested in genes, radiation and changes in heredity. He also studied various aspects of the statistical study of natural phenomena. In 1937 he came to Pasadena in California where he remained until his death. In 1937 he developed a method of work with bacterial phages (viruses) and was the recipient of a grant from the Rockefeller Foundation which brought him to work on genetics and through genetics to molecular biology; he made a significant contribution to the discovery of the DNA double helix. His work demonstrated that modern biology should make full use of mathematics, physics and chemistry. He himself taught a whole generation of outstanding biologists from the whole world.

history + biology, molecular biology, Max Delbrück - 147361.

771. FIŠEROVÁ, J.:
K životnímu jubileu Doc. dr. Věry Hladké (An important anniversary of prof. Věra Hladká)
Přírodní vedy ve škole, 33, 1981-1982, No. 1, pp. 9-10.
1 photo.

Prof. Věra Hladká was 75 years old in 1981. She is well known for her successful scientific and educational work in anthropology, child biology and school hygiene. In 1929 she defended a thesis on historical anthropology and then worked at various secondary schools, where she taught human anatomy and physiology, as well as hygiene. In the period 1948-1961 she was at the Research Institute for Pedagogics in Prague where in 1958 she defended a Candidat of Science thesis. She was the author of 16 textbooks on human biology and hygiene for basic and secondary schools. In 1961 she came to the Pedagogical Faculty at Brandýs n/L. and then to the Pedagogical Faculty of the Charles University in Prague where in 1963 she defended a thesis on the physiology of the higher nervous system in humans. She published over 20 original works and actively participated in the organization of Biology Olympiads. She received several awards for her work.

history + biology, anthropology, Věra Hladká - 147305.

772. GERHARDT, A.:
Hans Grupe zum 75. Geburtstag (At the occasion of Hans Grupe's 75th birthday)
Naturwissenschaften im Unterricht - Biologie, 30, 1982, No. 5, p. 145.

The West German specialist in the didactics of biology, Hans Grupe, will celebrate his 75th birthday. He is the author of a number of books on the didactics of biology and his main contribution is the stress he placed on the use of original biological objects in biology instruction and organizing extensive contacts between pupils and living nature. The author provides his brief biography: In 1955 he became a professor of the didactics of biology, the first in this field in the Federal Republic of Germany. He contributed to the modernization of teaching syllabi and to making the didactics of biology a specialization taught at institutions of higher learning. For 25 years he collaborated with the journal Naturwissenschaften im Unterricht.

history + biology, didactics of biology, Hans Grupe, FRG - 147305.

773. Hans Krebs - Entdecker des Zitronensäurezyklus
(Hans Krebs, the discover of the citric acid cycle)
Biologie in der Schule, 31, 1982, No. 11, p. 492.

On November 22, 1982 we shall commemorate the first anniversary of the death of H.A. Krebs. He was born in 1900 as the son of a Jewish physician. After receiving a degree in medicine he worked with prof. Warburg in Berlin. As a "privatdozent" for metabolic disorders he discovered in 1932 the ornithine cycle. In 1933 he emigrated to Britain where as a pharmacology professor he discovered in 1936-1937 the citric acid cycle, also known as the Krebs cycle, for which he received the Novel Prize in 1953. He also did important work concerning the creation of urea, the synthesis of ureic acid, glutamine, the assimilation of carbon and the transformation of energy.

history + biology, biochemistry, anniversary,
H.A. Krebs - 147305.

774. KOČÁREK, E. - LIĎKOVÁ, E.:
K životnímu jubileu PhDr. Antonína Altmanna (At the occasion of Dr. Antonín Altmann's birthday)
Přírodní vědy ve škole, 33, 1981-1982, No. 4, p. 133.

Dr. Antonín Altmann was born in 1921 and in 1981 celebrated his 60th birthday. He graduated from the Faculty of Natural Sciences of the Charles University in Prague in 1949 and became a science and geography teacher in a secondary school. He subsequently worked in all types of schools, and since 1959 at the Pedagogical Institute in Prague. Since 1964 he worked at the Pedagogical Faculty of the Charles University in Prague. As a specialist in the didactics of biology he has written a number of textbooks and books such as An Introduction to the Didactics of Biology, Organizational Forms in Biology Instruction, Natural Objects in Biology and Geology Instruction, Aids in Biology Teaching, Methods and Principles in Biology Teaching, Educational Aspects of Biology, The Methodology of Civics, Work Education for Defective Children, The Methodology of Animal Breeding and Plant Cultivation Work in School etc. Since 1955 he is a member of the editorial board of the journal Přírodní vědy ve škole and the author of various teaching aids such as science pictures for basic school, slide series, cassette films, collections of natural objects, microscopy specimens and worksheets.

didactics of biology, anniversary, A. Altmann - 147305.

775. RÜTHER, F.:

Prof. Dr. rer. nat. Rolf Dircksen zum 75.Geburtstag

(For prof. Rolf Dircksen at the occasion of his 75th birthday)

Praxis der Naturwissenschaften - Biologie, 31, 1982, No. 12, pp. 381-382. 1 photo.

The well-known West German ornithologist, prof. Dircksen, celebrated his 75th birthday. He is the author of a number of books on birds (Die Insel der Vögel, Das Wattenmeer, Vogelvolk auf weiter Reise, Am Meer und hinter dem Deich), as well as textbooks (Tierkunde I. und II, published by the Bavarian School Publishers). In 1976 he became a professor of biology and the didactics of biology and recieved various awards for his outstanding work.

didactics of biology, ornithology, anniversary, Rolf Dircksen - 147305.

776. STARCK, T.:

Wspomienie o profesorze Tadeusze Gorzyńskim

(Recollections of prof. T. Gorczyński)

Biologia w szkole, 35, 1982, No. 2, pp. 126-127.

On January 5th, 1982 prof. Gorzyński, an outstanding Polish botanist and educator who educated large numbers of students, died. The article describes his life, and his work as an educator and scientist. He was the chief of the Botanical Institute of the Warsaw University and held a number of offices as a member of the Polish Botanical Society. He was also the co-author of the botany textbook for the 6th class of basic school and the editor of a number of journals and contributed to the organization of Biology Olympiads.

didactics of biology, botany, death, T. Gorczyński - 147305.

15.9 Scientific institutes

777. ELIÁŠ, P.:
Odborné kursy Slovenskej botanickej spoločnosti pre žiakov gymnázií "Specialized courses organized by the Slovak Botanical Society for students from general education secondary schools)
Přírodní vědy ve škole, 33, 1982, No. 8, pp. 290-291.

The Committee for Youth Activities of the Slovak Botanical Society of the Slovak Academy of Sciences comprehensively supports and develops various hobby club activities in botany which serve to supplement the knowledge learnt in school and to extend both theoretical learning and practical skills in botany. Stress is placed on education towards environmental conservation and the conservation of specific plants. The Society cooperates with central, regional and district Young Pioneer Houses and the Young Pioneer Organization of the Socialist Union of Youth. The Society also organizes specialized courses on botany, physiological ecology and flower cultivation which last for 2 to 3 days and are held at the end of May and beginning of June. The courses take place in the

Institute for Experimental Biology in Bratislava and are composed of lectures and practical demonstrations of plants, as well as various instruments.

scientific + institution, scientific society, botany, scientific education + youth - 147323.

778. LEPS, G.:
"Wissenschaftsentwicklung und Methodologie" - 8. Philosophische Sommerschule ("The development of science and methodology" - the 8th Philosophy Summer School)
Biologie in der Schule, 31, 1982, No. 10, pp. 436-437.

The 8th Philosophy Summer School was held on May 26th to 28th 1982 at the W. Ratke Pedagogical Faculty in Köthen. The curriculum of the school included 5 lectures: the author describes in detail three of them, which concerned biology. Also the names of papers on biology presented in the biology work section of the summer school are cited and the names of those who presented them.

scientific institute, seminar, science + methodology - 147323.

779. PUTRAMENT, A.:
Informacja o działności polskiego towarzystwa genetycznego (Information on the activities of the Polish Genetics Society)
Biologia w szkole, 35, 1982, No. 3, p. 186.

The Polish Genetics Society strives for the development and also popularisation of genetics. It also organizes congresses and seminars for non-members. It provides information on the situation in genetics and advances the study of genetics, research concerning the structure of DNA, molecular mechanisms of mutations,

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the structure and function of the gene, how gene division is regulated, mitochondrial heredity, as well as specific problems of heredity (such as problems of heredity in humans, in unicellular plants and animals). Its members also teach practical genetics for animal breeders and for gardeners, they organize excursions and visits to genetics institutes, etc. The author provides a list of scientific institutions found in Poland, which are concerned with this subject-matter. Genetics institutes in Poland are found in Warsow, Cracow, Poznan, Wroclaw, Gdańsk, Lodz, Lublin and Bialystok.

scientific institution, genetics, Poland - 147323.

780. SHAMIN, A.N. - KRIVOSHEINA, G.G.:
Nekotorye etapy rozvitiya nauchnikh biologicheskikh issledovaniy v SSSR (Some stages in the development of scientific biology research in the USSR)
Biologiya v shkole, 56, 1982, No. 6, pp. 8-12.

In Czarist Russia scientific research in biology was done only at Universities. The Academy of Sciences at that time had only 2 laboratories, 2 museums and one biological research station, with a total staff of 28. At that time biology research was also persued by several scientific societies. Also 2 marine research stations existed in Sevastopol and in Soloveck. In 1915 a committee was founded for the study of natural forces in Russia. The development of the biological sciences began after the Great October Revolution when far-reaching changes occured in the structure and organization of biological sciences, which gradually became a mighty force for the cultural and economic development of a socialist society. Gradually

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individual scientific institutes were founded in all regions of the USSR which led to fruitful creative work by all the nations of the USSR. Contemporary biology in the Soviet Union is of a high quality and scientific work is done in all biological specializations; biology contributes to the realization of important national economic objectives.

scientific institutions, biology, history, USSR - 147323.

781. Wenn alle Menschen der Welt .... Wissenschaftler rufen zum Friedenskampf (If all the people in the world ... Scientists appeal for the peace struggle). Biologie in der Schule, 31, 1982, No. 6, pp. 225-226.

The representatives of the Academies of Science of the socialist countries issued an appeal to the scientists of the world in October 1981. The proclamation stresses that in view of the existence of modern weapons every war can easily develop into a world conflict which can lead to the destruction of mankind and civilization. It has for instance been calculated that in case of nuclear war 50 to 100 million people would die on the first day. The proclamation also points to militaristic trends apparent among the ruling circles of the USA.

scientific institute, socialist countries, peace - 147323.

16. Geology

782. Concours d'entrée 1981 - épreuve de géologie
(Entrance examinations in geology in 1981)
Biologie, Géologie, 69, 1982, No. 2, pp. 411-417.
4 figs.

A document used in an entrance examination in geology which takes two hours. It is composed of a general part and a section on mining. On the basis of six worksheets(including three plans) the candidate is asked to give his answers in writing. These worksheets could be used for school Olympiads or other competitions after some adaptations are carried out.

geology, higher education, entrance examination - 147555.

783. GERARDINI, A.:
La crosta terrestre (The Earth's crust)
Scuola e didattica, 26, 1980-1981, No. 6, p. 69.
2 figs.

The author explains various hypotheses which exist concerning the creation of the Earth and the development of its crust. This subject-matter must be learnt before pupils can understand a number of topics in physical geography. The article also contains suggestions for solving problems and for dividing the subject matter in the best way. Wagener's theory of the division of the continents on Earth and an explanation of tectonics and the movement of continental blocks are described.

Geology, earth's crust - 147555.

784. GERARDINI, A.:
La rocce (Rocks)
Scuola e didattica, 26, 1980-1981, No. 7, pp. 57-58.
1 fig.

The study of minerology should be based on the independent work of pupils and the utilisation of their own experience. Didactical procedures should include excursions, the collection of specimens from the vicinity and writing down their locality, etc. Later the study of literature can be added and finally the writing of a research report. The article also contains instructions on the use of didactical methods concerning the atmosphere and its transformations.

geology, mineralogy, atmosphere - 147555.

785. GERARDINI, A.:
L'origine delle roce (The origin of rocks)
Scuola e didattica, 26, 1980-1981, No. 8, pp. 73-75.

Didactical procedures should stress pupils' understanding of the fact that the surface of the Earth is undergoing continuous cycles of transformations. Some of these cycles are very procounced, such as the eruption of volcanoes, while other processes, such as erosion and sedimentation occur unobtrusively, in tiny metamorphoses, over thousands and millions of years. Models can be used for this purpose, on which pupils can observe, on the basis of their own experiments, how erosion and sedimentation continue. The author provides detailed description of such models.

geology, earth's crust, transformations - 147555.

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786. GUIEU, G. - REDONDO, C.:
Apports de la gélogie fondamentale a la Géologie appliquée (The contribution which basic geology make to applied geology)
Biologie, Géologie, 69, 1982, No. 2, pp. 397-409.
3 figs.

First the authors cite the work of Claude Gouvernet who was the founder of the Geology Faculty at the University of Marseilles. They then discuss applied geology, above all the seeking of "useful substances" such as fuels and ores which the economy and industry require. But also other geological activities are discussed, for instance in the construction industry, in environmental conservation, etc. The work methods used by geologists are desdribed, including the creation of geological maps for designing construction projects. A number of geological terms are explained such as geomorphology, stratigraphy, paleontology, tectonics and finally paleography and sediment history.

geology + significance - 147555.

17. Economics and biology

787. PAGLIARI, M.:
Il problema delle differenze di sviluppo I.
(Problems of differences in development - I.)
Scuola e didattica, 26, 1980-1981, No. 14, pp. 56-57.

Within the framework of discussing environmental problems the author suggests a lesson on the problems of underdeveloped countries and the existence of different rates of growth in different countries; a lack of parity in growth has led to some countries being backward in nutrition, population developments, as well as the underdevelopment of their agriculture and low industrial productivity.

economics, biology - 147376.

788. PAGLIARI, M.:
Il problema delle materie prime e dell' energia I.
(Problems of raw materials and energy - I.)
Scuola e didattica, 26, 1980-1981. No. 9, pp. 43-44.

The author begins with the problem of raw material and energy waste in the rich countries and the threat of new energy and raw material crises in the future, as well as the conflict of rich and poor countries which is connected with this problem. This introduction to the topic is aimed at motivating pupils to seek methods for economizing fuel and raw materials - which is an ethical, economic and social imperative of the present. The author continues with an explanation of traditional energy sources, their distribution in the world and how they are exploited.

economics, biology - 147376.

789. PAGLIARI, M.:
Problema delle materie prime e dell'energia - II.
(Problems of raw materials and energy - II.)
Scuola e didattica, 26, 1980-1981, No. 10, pp. 55-56.
Lit. 1.

The author here discusses new energy sources such as atomic energy, solar energy, thermal energy sources, harvesting the energy of the seas and the possible exploitation and utilization of these sources in the future.

economics, biology - 147376.

790. PAGLIARI, M.:
Il Problema delle materie prime e dell' energie - III.
(Problems of raw materials and energy - III.)
Scuola e didattica, 26, 1980-1981, No. 11, pp. 55,
Lit. 1.

This final part of a three-part article deals with the strategy of economizing energy consumption, based on the systematic development of such products which require less energy. These strategies include for instance decreasing thermal losses, replacing such products as artificial fertilizers and chemical substances against pests with natural substances and replacing chemical methods of combating pests with biological methods. Energy can also be economised, for instance in transportation, etc. The energy problem is, however, linked to the general level of economic development and has somewhat different aspects in the developing countries.

economics, biology - 147376.

18. Technology and biology

791. HART, L.D. - CLEMAN, S.M.:
Tapping the Sun
The Science Teacher, 49, 1982, No. 1, pp. 28-33.
9 figs.

This article by scientists from the Solar Centre in Florida describes a school project for capturing solar energy which can be used as source of heat.

The authors describe the apparatus needed for capturing and transforming solar energy and how it can be inexpensively and easily built.

solar energy, technology - 147376.

792. SIMONIS, D.A.:
Energy: The Analogy Approach
The Science Teacher, 49, 1982, No. 2, pp. 41-44. 3 figs.

Usually we are unable to image an isolated thing, much less a term. But some thing which we do not understand well can be compared to something else which we know and understand better. This is an analogy. For instance energy terms are difficult to explain and can be made easier by providing analogies. The author explains such terms as the second law of thermodynamics and a number of others on the basis of analogies, which make them much easier to understand.

technology, energy, school - 147376

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Summary

DIDACTICS OF BIOLOGY - a selected bibliography for 1982

Published by the Central Library - Sectional Information
Centre of the Pedagogical Faculty - Charles University

Editor: Antonín Altmann

Responsible editor: Dr. Pavla Lipertová

Printed by: Tiskařské závody Čelakovice

Printing: 100

Number of pages: 617
Year of Publication: 1984
ÚVTEI 760 47/E
RUK 60-200